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# The OIL WEEKLY

OIL and GAS ENGINEERING

INTERNATIONAL AUTHORITY FOR THE PRODUCING AND PIPE LINE INDUSTRY

THE WEEK'S NEWS INTERPRETED

JUN 4 1940

H
H
WISDOM
MAJOR REQUIREMENT FOR ★★ 1940
HOWCO TESTER Is the performance-proved method by which operators make sure of a formation's productivity *before* incurring the expense of setting casing . . . Provides an accurate picture of the gravity and quantity of production . . . the presence of water or gas . . . temperature and hydrostatic pressure changes in the well —in brief, all the information you need to act with assurance and proceed with wisdom. Available everywhere.
HALLIBURTON OIL WELL CEMENTING COMPANY

VOLUME 97 JUNE 3, 1940 NUMBER 13

# *in Business for Your Safety*

## AMERICAN CABLE
## TRU-LAY *Preformed* DRILLING LINES

### *THE TRUE STORY OF A SLOGAN—*

Most slogans for business organizations are coined phrases designed to help sell either merchandise or service. Our slogan, "*In Business for Your Safety*," voices this company's policy; this organization's spirit.

More than thirty years ago Weed Tire Chains were put on the market to make motoring safer. Thus the American Chain and Cable Company was conceived in Safety and has always been dedicated to that ideal. Today ACCO products are to be found serving faithfully and safely in nearly every field and industry.

Fifteen years ago we introduced preformed rotary drilling lines—American Cable TRU-LAY. We did so not only because preforming made TRU-LAY a line of longer service but—a safer line. TRU-LAY Preformed is safer to handle; safer to use. It resists whipping; spools better; makes possible faster round trips. Broken crown wire doesn't wicker out to jab workmen's hands. The heritage of safety is a tradition with American Chain & Cable men. The entire organization stands as a single unit behind the true meaning of "*In Business for Your Safety*."

BUY ACCO QUALITY *whether for American Cable Wire Lines—American Welded and Weldless Chains—Ford Chain Blocks—Page Welding Wire—Reading-Pratt & Cady Valves—or any of the other 137 ACCO Quality Products.*

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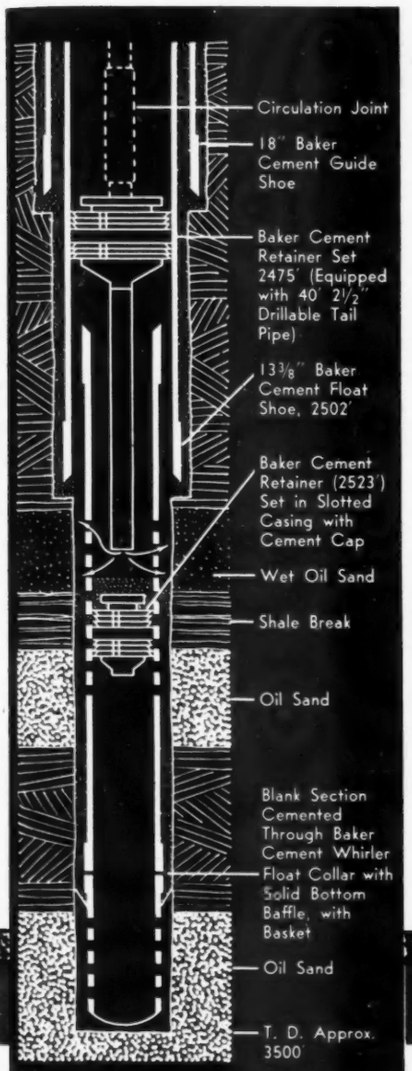
**AMERICAN CHAIN & CABLE COMPANY, INC.**

BAKER
SAVE A WELL
CEMENT RETAINER


Circulation Joint
18" Baker Cement Guide Shoe
Baker Cement Retainer Set 2475' (Equipped with 40' 2½" Drillable Tail Pipe)
13⅜" Baker Cement Float Shoe, 2502'
Baker Cement Retainer (2523') Set in Slotted Casing with Cement Cap
Wet Oil Sand
Shale Break
Oil Sand
Blank Section Cemented Through Baker Cement Whirler
Float Collar with Solid Bottom Baffle, with Basket
Oil Sand
T. D. Approx. 3500'

Use of Baker Cement Retainers to Blank Off Wet Oil Sand Behind Slotted Casing

# BAKER
# CEMENT RETAINER

## CASE STUDY NO. 407

**PROBLEM:** *To shut off wet zone behind slotted casing*

**METHOD:** *Bridge slotted interval with Baker Cement Retainer (as a Bridge Plug) and perform multiple-batch squeeze cement job with second Retainer equipped with 40' (drillable) tail pipe*

**RESULT:** *Complete water shut-off obtained*

### • DETAILS •

Field: Maricopa, Calif.

Depth of Well: Approx. 3500'

Depth Retainer Set: 2475'

Breakdown Pressure: 100#

Final Pressure: 1st. batch- 100 Sax - 800#
2nd. batch- 100 Sax - 1500#

Number of Sax Put Away: 200

How Cement Discharged: Through lower end of Tail Pipe into 20' section Slotted Casing

THE BAKER CEMENT RETAINER has provided the solution to many Cementing, Well Repair and Well Completion problems confronting the modern operator . . . perhaps it will solve a particular problem confronting YOU. Complete details concerning its many practical field applications will be found in the Baker section of the Composite Catalog . . . also in Baker Broadcast No. 17-A, a comprehensive, 40-page illustrated treatise which will be sent to interested oil men upon request.

7

*A Case Study of an Actual Well Repair Problem Solved By Using the Baker Cement Retainer*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**IMPORTANT CEMENT RETAINER APPLICATIONS INCLUDE:**

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BAKER CEMENT RETAINER

Choose THE RIGHT
POWER
FOR OIL FIELD SERVICE

21
Continental
Red Seal
SIZES

CONTINENTAL MOTORS · Power for Every Nation · AMERICA'S STANDARD

Whether for spudding, drilling, pumping (individually or from central power plant) generator service for power or lighting, the operator must give careful consideration to power units that are built to "take punishment." Continental Red Seal Engines can "take it," because they're built for it.

1. Quick, push-button starting.
2. Individual porting (an exclusive patented Continental feature) which means smooth, balanced power.
3. Full length of cylinders surrounded by water for efficient cooling with jackets designed to eliminate hot spots.
4. Precision, interchangeable steel backed bearings.
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Norris Brothers, Inc., Robinson, Illinois

Continental Motors Corporation
MUSKEGON, MICHIGAN

**ACIDIZING HAND BOOK**

By BENSON M. KINGSTON

***A timely, thoroughly practical book on a most important subject***

Acidizing Hand Book takes up the purpose of acidizing, gives full information on formations which are treatable, tells how to determine treatability of formations, how to prepare a well for acidizing, and contains a section of tables extremely valuable to an operator planning to acidize a well.

**The book is divided into 14 chapters which include:**

**Chemistry and Geology of Treatment—Treatment Acid—Preparation of Wells for Treatment—Mechanics of Treatment (4 chapters)—The Reaction of Salt Water to Treatment—Producing the Well After Treatment—Acidizing Gas Wells—Re-treatment and Multiple Stage Treatment—Other Uses of Muriatic Acid in the Field, and Computations in Acidizing.**

The author has had many years of experience in practical work acidizing wells.

The Acidizing Hand Book has a Fabrikoid binding, size 5½ x 8 inches, and contains 78 pages.

**PRICE $1.50, POSTAGE PREPAID**

Address Book Department

**Gulf Publishing Co., Houston, Texas**

# Looking Ahead

WITH THE EDITOR

**MANY 50-YEAR OLD WELLS** are still producing substantial quantities of oil. Primarily responsible for the continued, and actually increasing, production of these old wells has been the introduction of improved methods of recovering oil. For example, water flooding has boosted production in the famous Bradford field of Pennsylvania, which was discovered in 1874, until it has reached almost the peak production in its greatest year, 1881. Production in this field, the outstanding example of water-flooding, had dropped rapidly to a nadir shortly after 1900, and it was commonly believed that the sand almost was exhausted. Then water flooding was discovered, legalized and introduced in the field, and production began a steady climb. It now is 11 times the yield at the low point.

Water flooding is but one of several secondary recovery methods developed to increase production from oil sand apparently near depletion. Gas and air injection also have made startling advances in recent years .These technological advancements promise larger quantities of oil for the consuming public, and indicate that the industry's scientists have not yet depleted their ingenuity, and additional improvements in the future are likely.

**A NEW PARAFFIN REMOVAL METHOD** representing a sharp departure from previous procedures has been used with sufficient success in the Texas Panhandle area during the past two years to warrant installation of 30 permanent units. A record of cost shows the procedure to be less expensive than other methods that have been used in the region. The process consists of heating the tubing electrically. Special well equipment had to be designed for this purpose, and it is permanently installed in the tubing string. The process, development of equipment, and results are to be the subject of an early article.

**OIL INDUSTRY LEADERS,** in the early rush of American defense preparedness, have been all-concerned with the question of arming the nation—in contrast to other interests whose first thought often has been toward influencing location of armament plants and training camps to their strategic benefit. But these men know that the outcome of the European conflict not only will affect world oil markets as they have existed, but involves control of all supplies except on the American continents. If the conflict comes nearer, oil fields and refineries are vulnerable points in the national defense that must be protected.

The OIL WEEKLY, Published every Monday. Entered as second-class mail matter December 23, 1916, at the post office at Houston, Texas, under act of March 3, 1879.

# DEPENDABLE PERFORMANCE

## *IS ESSENTIAL LONG AFTER THE SALES TALK IS FORGOTTEN . . .*

# BAASH-ROSS LINER HANGERS

Liners in thousands of wells are suspended from BAASH-ROSS Liner Hangers, and the number is growing larger every day. The running and setting operations are positive, safe, and easy — services of a special operator are not required — and the simple, thoroughly proved method of setting the slips permits the liner to be suspended immediately upon reaching the desired level.

You can depend upon BAASH-ROSS Liner Hangers to support your longest, heaviest liners safely. The slips have the maximum usable contact area for gripping the well casing without damaging it, and the liner stays at the desired point in the hole until its position is changed by the operator.

*There is a BAASH-ROSS Liner Hanger to meet every liner-suspension need — choose from these*

## THREE SUCCESSFUL TYPES

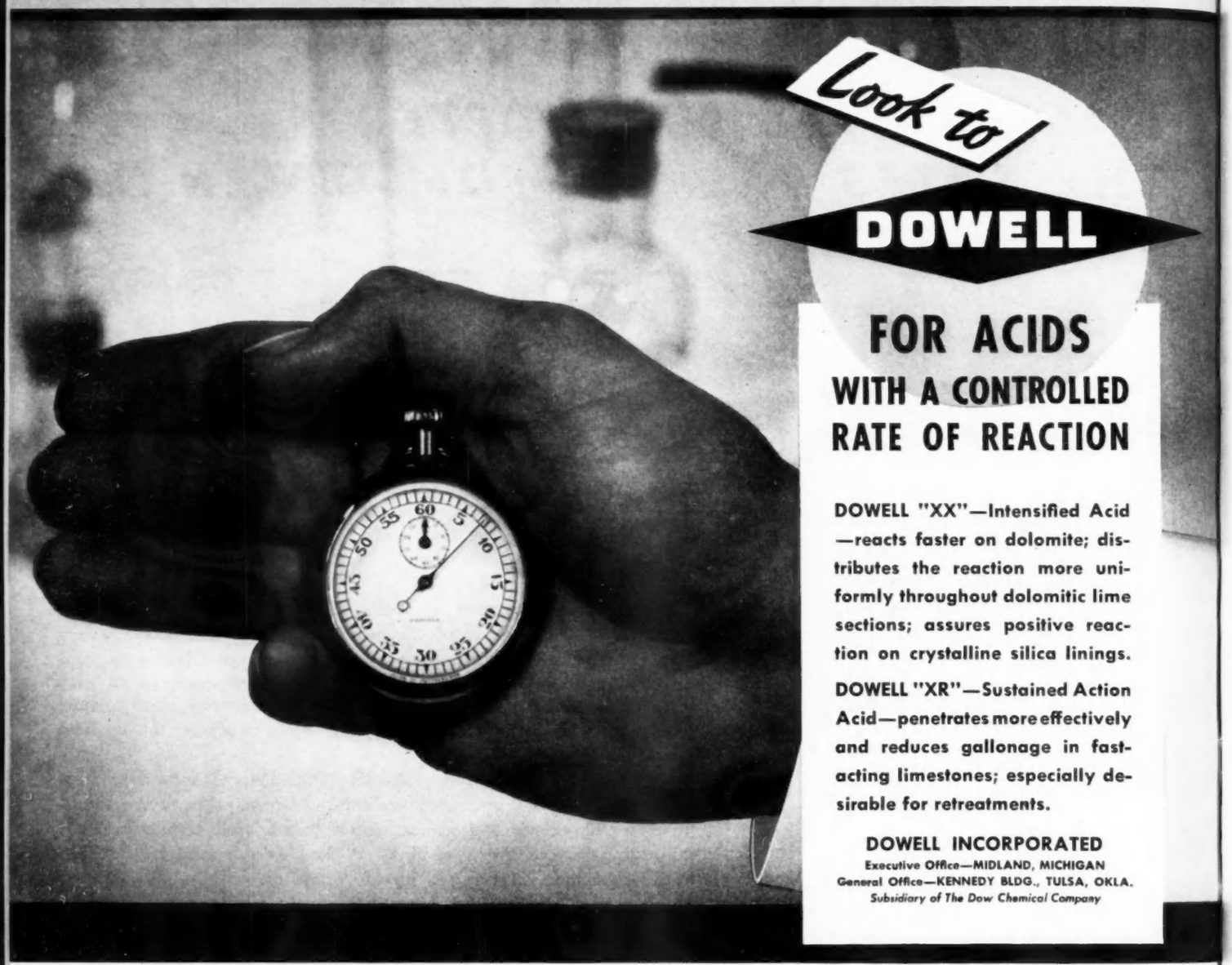
1. CIRCULATING LEAD SEAL PACKING TYPE — With this type, the liner is first suspended by setting the slips, then the hole behind the perforations is thoroughly washed with circulation. Ample space is allowed between the slips for upward flow of the washing fluid. When the hole is clean, the lead packing rings are expanded and the setting tool is released. The BAASH-ROSS Liner Setter Mandrel and Adapter, almost universally accepted as the easiest means of running and setting liners, are shown in Figure 1.
2. LEAD SEAL PACKING TYPE — A perfect, permanent seal for as long as the liner is left in the hole is assured by the pure lead packing. This packing does not become cemented to the casing through pressure, heat or long standing, therefore the liner can be removed at any time. When the weight of the liner is rested upon the slips the lead sealing rings are automatically expanded into tight contact with the well casing.
3. PLAIN TYPE — This type is used when support only is required for the liner, to keep it from buckling or "drilling" itself into the formation.

# BAASH ROSS

TOOL COMPANY
OIL WELL TOOLS · SPECIALTIES

LOS ANGELES
HOUSTON · NEW YORK

# Timed Acidizing Gets Results



Look to

**DOWELL**

## FOR ACIDS WITH A CONTROLLED RATE OF REACTION

**DOWELL "XX"**—Intensified Acid—reacts faster on dolomite; distributes the reaction more uniformly throughout dolomitic lime sections; assures positive reaction on crystalline silica linings.

**DOWELL "XR"**—Sustained Action Acid—penetrates more effectively and reduces gallonage in fast-acting limestones; especially desirable for retreatments.

**DOWELL INCORPORATED**
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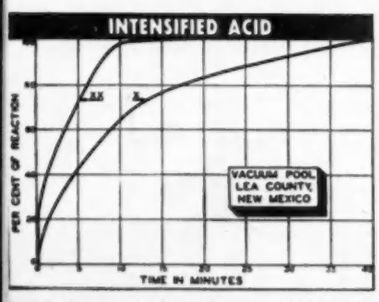
*Subsidiary of The Dow Chemical Company*

ACIDS with a controlled rate of reaction are never the result of simply mixing a concoction in a test tube. Years of research in the laboratory and in the field are necessary in order to develop them. Dowell "XX" *Intensified* Acid and Dowell "XR" *Sustained Action* Acid are excellent examples of this orderly procedure in scientific development.

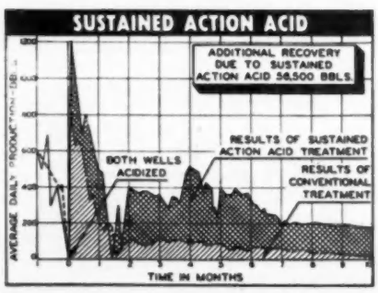
Early treatments determined that impure limestones, dolomites and dolomitic limestones would not react properly with ordinary inhibited acid. Therefore, Dowell developed certain intensifying agents which acted as catalysts and speeded the rate of reaction. The results have been amazing—immense additional quantities of oil have been recovered. Thus, Intensified Acid—Dowell "XX"—has become an invaluable formula in successful acidizing.

For greater effective penetration with less gallonage in fast acting limestones, Dowell developed retarding agents for addition to *Inhibited* Acid. A slower reaction rate, a greater penetrating depth and an increase in permeability resulted. Thus Sustained Action Acid—Dowell "XR"—was born.

The friendly cooperative attitude on the part of oil men and the great technical ability of The Dow Chemical Company, Dowell's parent organization, are weighty factors in these important developments. They provide Dowell with a combination of skill and knowledge that is unsurpassed in any branch of American industry.




Curves show reaction rate of ordinary Dowell "X" in producing formation of Vacuum Pool, New Mexico, compared with reaction of Dowell "XX" Intensified Acid.


SUSTAINED ACTION ACID
ADDITIONAL RECOVERY DUE TO SUSTAINED ACTION ACID 58,500 BBLS.
RESULTS OF SUSTAINED ACTION ACID TREATMENT
BOTH WELLS ACIDIZED
RESULTS OF CONVENTIONAL TREATMENT
AVERAGE DAILY PRODUCTION - BBL.
TIME IN MONTHS

This chart shows the greater oil recovery value of Dowell "XR"—Sustained Action Acid, when compared with treatments using ordinary acid.

**DOW SERVES THE NATION WITH CHEMICAL PRODUCTS**

*For example: Dow is playing a large part in modern methods of processing leathers by its development of DOWICIDES* and other chemical products now regarded as indispensable in this industry.*

*Trade Mark Reg. U. S. Pat. Off.

# THE OIL WEEKLY

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SPECIALIZED OIL JOURNALS
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## The Oil Man's Calendar

| | |
|---|---|
| **JUNE** | |
| 3– 6 | National Association of Purchasing Agents, Oil Company Buyers' Group, Cincinnati. |
| 20–21 | Pennsylvania Grade Crude Oil Association, Bradford, Pa. |
| 21–22 | Kentucky Oil & Gas Association, Lexington. |
| 29 | American Petroleum Institute, Illinois Basin Chapter, Evansville, Ind. |
| **SEPT.** | |
| 9–13 | American Chemical Society, Detroit. |
| 18–20 | National Petroleum Association, Atlantic City, N. J. |
| **OCT.** | |
| 7–10 | American Gas Association, Atlantic City, N. J. |
| 7–11 | National Safety Congress and Exposition, Chicago. |
| 16–18 | Independent Petroleum Association of America, Dallas. |
| 31 Nov. 2 | Texas Mid-Continent Oil & Gas Association, Ft. Worth. |
| **NOV.** | |
| 11–15 | American Petroleum Institute, Chicago. |
| **1941** | |
| **APR.** | |
| 24–25 | National Petroleum Association, Semi-Annual Meeting, Cleveland. |

## Contents « June 3, 1940

### Volume 97, Number 13


The Week's Panorama..... 9

Feature Section:

The American Way..... 10

Defense Preparation Predominates at A.P.I. Mid-Year Gathering..... 11
By WARREN L. BAKER

A Review of the Principles of Oil Reservoir Performance 15
By T. V. MOORE

Effect of Formation Permeability on Plastering Behavior of Mud..... 19
By H. T. BYCK

Prevention and Removal of Paraffin Accumulations..... 22
By W. Y. BROWN

Taylor-Made Insurance Offered Rig Owners..... 43
By ARTHUR C. BURNETT

This Year Bringing Nearly as Much Drilling as 1937.... 44
By JACK LOGAN

News Section and Index..... 47

Drilling Contractor's Note Book..... 41

Looking Ahead With the Editor..... 4

Notes for the Equipment Buyer and User..... 80

Squeaks From the Bull Wheel..... 89

Index to Advertisers..... 90



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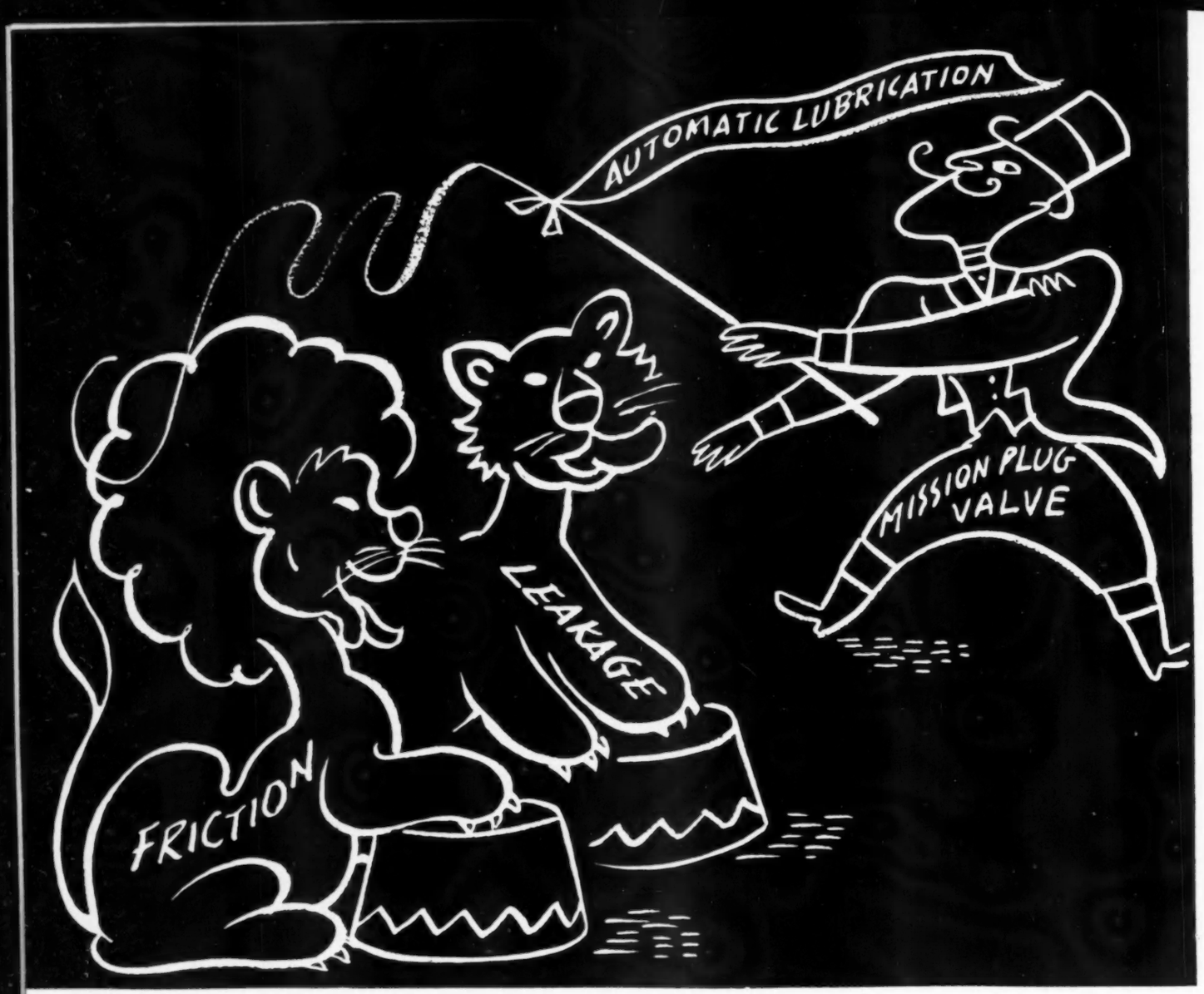


# Automatic Lubrication of the New Mission Plug Valve keeps Leakage and Friction in check

Tested on drilling rigs, flow lines and Christmas trees for 24 months without a failure.

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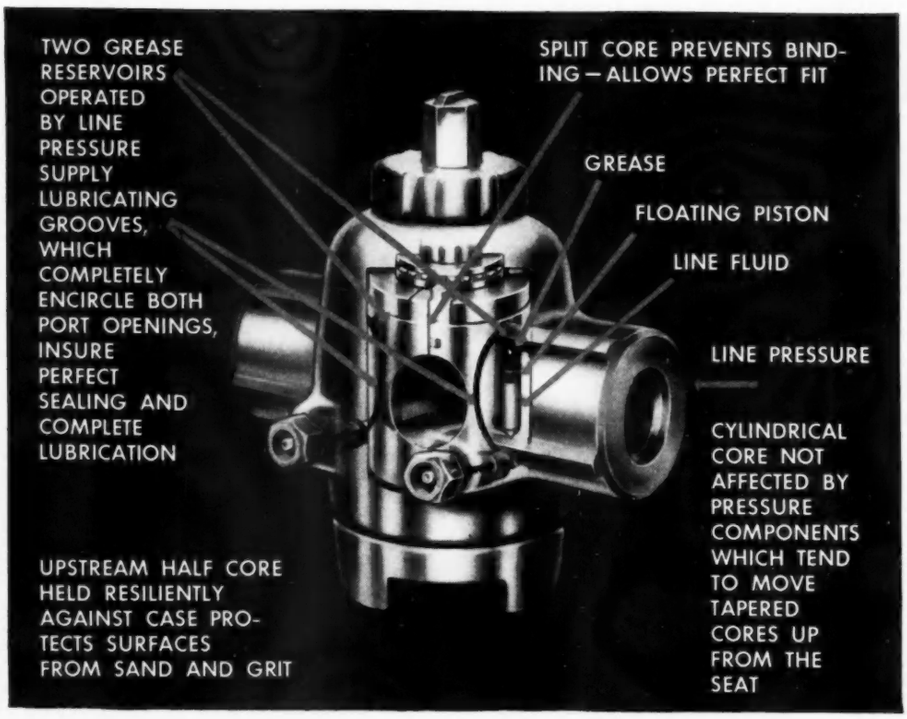
TWO GREASE RESERVOIRS OPERATED BY LINE PRESSURE SUPPLY LUBRICATING GROOVES, WHICH COMPLETELY ENCIRCLE BOTH PORT OPENINGS, INSURE PERFECT SEALING AND COMPLETE LUBRICATION
SPLIT CORE PREVENTS BINDING—ALLOWS PERFECT FIT
GREASE
FLOATING PISTON
LINE FLUID
LINE PRESSURE
CYLINDRICAL CORE NOT AFFECTED BY PRESSURE COMPONENTS WHICH TEND TO MOVE TAPERED CORES UP FROM THE SEAT
UPSTREAM HALF CORE HELD RESILIENTLY AGAINST CASE PROTECTS SURFACES FROM SAND AND GRIT

# THE OIL WEEKLY

JUNE 3, 1940

VOLUME 97 NUMBER 13

## The Week's Panorama

DESPITE the national defense program, no let-up is in prospect in the drive of the Department of Justice against oil companies, on anti-trust charges. The decision of the Supreme Court, upholding conviction of 12 companies and 5 individuals in the Madison cases, has paved the way for other similar suits. And although efficient functioning of the oil industry will be essential in furthering the defense program, no immunity to anti-monopoly laws is considered by the government as necessary or justified.

• • • Indeed, it appears that the defense program puts the industry more than ever on the defensive against government criticism. The industry is in a position in which it is expected to foresee and take care of any military demands made upon it, and to do that without any special favors from the government. And the penalty, in case of failure, naturally would be nationalization of the industry. The current emphasis on national defense clearly brings nearer the federal regulation that the administration persistently has sought.

• • • Insofar as its ability to meet any emergency demand upon it is concerned, the industry has no misgivings. Without benefit of government paternalism, the industry diligently has expanded the nation's underground crude reserve to unprecedented proportions, having pushed the possibility of an oil shortage farther and farther into the background, until the problem of assuring adequate supply has been overshadowed by the necessity of holding chokes on flow lines of flush wells. No government-operated oil industry of the world has approached the effectiveness of the privately-run oil business of the United States in searching for and finding oil.

• • • Moreover, pipe line and refining facilities have been built and maintained on the same efficient basis as evidenced by the smoothness and dependability with which the industry daily supplies 30,000,000 automobiles and trucks and all the country's airplanes.

• • • The industry regularly plows back a large part of its always-moderate earnings into its operations, maintaining or expanding crude reserves, modernizing and enlarging refineries, laying pipe lines where needed, and promoting greater efficiency and usefulness through laboratories and research. And always the industry has managed to keep comfortably ahead of the maximum demands made upon it, as regards both quantity and quality of oils.

There are no good reasons to believe that the industry would fail the nation in any war emergency.

• • • The Department of Justice is expected to reveal within a few weeks the particular nature of anti-trust suits that will be filed against oil companies, although it already has indicated that the cases will call for divorcement of pipe lines and marketing from other operations.

• • • A representative of the department early this year asked Congress for funds for: "the oil cracking case, the Pacific Coast oil case, the East Coast oil case, and the petroleum marketing divorcement suit." Investigations have been under way several years.

• • • It has been indicated that the Department of Justice may be willing to accept pleas of nolo contendere, where no "moral turpitude" is involved, in the California anti-trust suits, which are closely similar to the Madison cases.

• • • The federal government has indicated that it questions particularly the avoidance of law violations in the maintenance of the present differentials between regular and premium grades of gasoline. In that connection, the Department of Justice intimated disappointment over the circumstance that prices of premium gasoline did not decline in consequence of the decision in the Ethyl Corporation case. The department is believed to be aiming marketing divorcement litigation toward the weakening of differentials between premium and regular grades.

• • • United States industry spent about $200,000,000 in 1939 on research, and the petroleum industry accounted for one tenth of that total. The research budgets provide on the average for expenditure of ½ to 1 percent of net sales revenue.

• • • Research is opening up important new markets for the oil industry by promoting development of numerous chemical products as derivatives of petroleum. Particularly important among the new products are plastics, synthetic resins, and solvents. The industry already has begun turning out synthetic rubber, which in some respects is superior to natural rubber. The resins will find large use as coatings in paints, varnishes, and enamels, and in adhesives and binders.

• • • United States manufacturers sold 25 percent more automobiles and trucks in the first four months of 1940 than in the corresponding months of 1939, and twice as many as in the similar period of 1938. The 1,692,677 vehicles disposed of included 1,415,714 passenger cars and 276,963 commercial cars, trucks, and road tractors.

# The American Way

THE people of the United States are responding to the call of preparing to forfend the national dangers deemed imminent because of recent developments overseas, in a manner characteristically American. The response would indicate that the "Spirit of '76" is alive as it always has been when national danger was sensed or impending. This spontaneous revival of patriotism has an element of reassurance with it that the spark which has made this country great has not been cooled.

The oil industry is called upon to reveal its ability to meet national requirements in any emergency. This industry keeps a permanent inventory of its stocks, its reserves and its ability to produce. These figures show that it stands ready to deliver its product in needed quantity and quality when it is required.

AND in man power! If emergency arises, this industry can spare from its research staffs alone the most formidable array of chemical and engineering talent that can be offered by any branch of industry—and they are trained in the American way: engineers from ditch digging through the intricacies of building and handling rugged or scientifically complicated machines, on into pure science—and particularly of gases.

Coordinate with the oil industry are the vast manufactories which have been built up exclusively to make its supplies. Here are machine shops and trained personnel ready on short notice to go into high gear making parts for the war machine if emergency arises.

The oil industry has an armada of tank ships ready to become auxiliary to the Navy, insuring that the fighting boats would have fuel supplies and ready to deliver it to the most remote outposts. These tankers, normally moving between domestic ports, can be spared from this service by speeding rail and pipe line movements when emergency subordinates costs.

These are all ready in the American way—because petroleum and its men are instinctively American.

IN WORLD WAR No. 1 the petroleum industry, then much less developed in science and man power than now, met the emergency in a manner which provoked specific commendation. It did its part in the American way. The best brains of the industry, collected at the invitation of the government, contributed the experience of generations and the stern enthusiasm of determination.

The plan worked because there was one thought—to win the war, and because there was a minimum of political mediocrity involved.

Should war come, or should the petroleum industry be called upon to contribute its substantial part in arming for defense, it should be done in the American way, by calling into power again an organization from within the petroleum industry itself. There is a powerful nucleus remaining from the juniors of the old board, although many of those who served on it have passed from the scene.

There should be no action on the part of the federal government to consummate the ambition of some federal authorities in taking over the petroleum industry and accomplishing under the guise of the needs of war, that which could not be accomplished in the legislative halls in time of peace.

Should America go to war soon, or should America prepare for a conflict which will be ultimately inevitable if Germany should win, it must be done in the American way. Only through the utmost co-operation can the desired goal be attained.

President Roosevelt has proclaimed his highly justifiable position that labor will receive the fairest treatment. He should make plain a position that industry as well will be treated fairly. To do otherwise would place us at the very beginning in the position of already having arrived at a point of partial defeat of the ideas and principles for which we would fight.

# Defense Preparation Predominates A. P. I. Meeting

By WARREN L. BAKER, Editor

WHAT was scheduled as a Mid-Year oil industry technical and standardization meeting of the American Petroleum Institute quickly developed into a gathering of men whose foremost thought was the danger of the United States becoming involved sooner or later in war and the need for defensive preparation.

Throughout five days last week, lobbies, dining rooms and private room of Fort Worth hotels buzzed with but one common subject, the war. News from European battle fronts added flame to the theme. Preparedness, threats of Fifth Column activities and means of combatting it superseded all other conversation, except in the technical sessions themselves, and even these seemed to take on a more sombre tone.

Besides talk among individuals, the question of national defense came in for attention at the only general session, when General John A. Hulen was the principal speaker and devoted his remarks to national defense. The board of directors of the Institute adopted two resolutions, one of which pledged the industry's facilities and service in meeting military and civilian requirements. The other resolution urged adoption by Congress of the bill providing for the creation of a National Industrial Defense Corps to protect against sabotage. Petitions to the Congress for immediate passage of an amendment to the National Defense Act that would create a National Industrial Defense Corps were circulated through the lobbies and found few unwilling to sign.

### Fifth Column Defense Urged

Peculiarly, unlike other former and similar gatherings, conversations did not hinge on what influence the current warfare in Europe would have on the oil industry. That question was asked infrequently, most of the talk being on what the turn of events in Europe might do to America and American ideals and institutions.

In passing and signing the petitions asking the Congress to provide for the establishment of the so-called National Industrial Defense Corps (NIDC) it was asserted that it was idle to prepare to defend a front and leave vital rear areas helpless. The destruction of Norway, Denmark, Holland, Poland and Belgium was pointed out as having been accomplished in large part by spies, saboteurs, traitors and parachute troops operating far behind the front lines, and as indicating that ordinary police and unorganized civilians could not cope with the activities of fifth columns.

France, for all her huge army, finally recognized a defect which a "special militia" alone can remedy. This was said to be of striking significance. It was urged that now, not eight months after a war emergency, was the time to begin a program of national defense.

The NIDC plan was regarded as affording protection against open violence, and as the first necessary step in war defense preparedness.

Since police forces are small in number, they would be unable to quell organized force of any size, particularly where the opposing forces struck at a number of widely separated points. In an emergency, the Army and National Guard would constitute the initial front line troops. Thus only civilians, unorganized and unarmed, would be left to protect industry and transport which, if damaged or destroyed, could result in paralyzing the front line fighting forces, unless special militia groups were created at home.

### NIDC Provisions

The bill providing for the National Industrial Defense Corps, which was drafted by George A. Hill, president of Houston Oil Company of Texas and vice president of the American Petroleum Institute, has been introduced into Congress by Senator Morris Sheppard of Texas and is expected to receive early attention.

The bill would amend the National Defense Act so that men not fighting in front line trenches, because of age or other reasons, could be organized into home defense units known as the NIDC. This would include business men and other civilians who would serve without pay. These men would be trained, perhaps on two or three nights weekly, to protect certain vital spots (power plants, industrial plants, water supply, bridges, etc.) located in their immediate neighborhood. Under the command of ex-service men, the groups would be organized throughout the country. Their names, addresses and arms would be listed. When an emergency, such as a fifth column movement, should arise, they would have prior instruction in just what to do, how to do it, and could be dispatched quickly. Each man would be assigned to a particular job in the vicinity of his home.

It was argued that such a corps would be effective. Nobody is so likely to know the spy or the saboteur as the man working alongside of him. Seeing him daily, hearing a scrap of conversation here and there, being acquainted with his habits and associates, a fellow-workman could spot a potential "fifth columnist" more quickly than a good detective. Such reports transmitted to a central agency might result, it was pointed out, in a clear picture of a nefarious scheme, where fragmentary information would only blur.

### Directors Act on Defense

Full, complete and voluntary co-operation of the petroleum industry with the United States government and its agencies in furtherance of national defense was pledged at a meeting of the board

## BILL

## For Creation of National Industrial Defense Corps in United States

***AN ACT to amend Chapter 5 of Title 32, U.S.C.A. of the Acts of June 4, 1920, Chapter 227, sub-chapter 1, and the Act of January 21, 1903, Chapter 196, Section 4, by adding thereto Section 81-b.***

DECLARATION OF PURPOSE:

It is the declared purpose of this Act to provide for a defense of the home front in time of war and prior thereto, to prevent interference with the Government's program in preparing for defense, and to give adequate protection to all industries of every nature now or hereatter declared to be essential to national defense; to discover and combat subversive and treacherous activity, and for this purpose to constitute a special, limited service component of the national militia to be known as the National Industrial Defense Corps.

THEREFORE, BE IT ENACTED BY THE CONGRESS OF THE UNITED STATES:

**Section 81-b:** Whenever the President shall deem it necessary to the national security, he is authorized and empowered to designate an industry or industries as being essential to the national defense, and he shall have the power in time of peace to accept enlistment of men employed by or occupied in such essential industries for such period of time as he may from time to time prescribe under the following conditions:

(a) Such component of the national militia shall be known as the National Industrial Defense Corps (hereafter for brevity referred to as NIDC). Every person enlisted and accepted in NIDC shall be a citizen of the United States; shall be above the age of 21 years; and shall be employed by or occupied in an essential industry as declared by the President.

(b) Application for enrollment shall be made under oath, and shall be accompanied by proof of qualification as to character and employment certified to by a responsible officer or official of the applicant's employer, and such application shall be subject to acceptance or rejection by a reviewing authority appointed for this purpose, and, if accepted, a certificate to this effect shall be furnished the applicant, which application and certificate shall constitute the applicant's enrollment in the NIDC.

(c) The members of the NIDC shall have the right to bear arms and shall have the authority now granted to U. S. Marshals, but only to the extent and in the manner as may be from time to time prescribed by or under the authority of the President, and all arms to be utilized by the members of the NIDC shall be registered as to caliber or gauge, type of weapon, the manufacturer and serial or identifying number.

(d) No compensation shall be paid by the United States Government to members of the NIDC, nor may its members be required to serve beyond the area prescribed in the member's certificate, or, within such area, be called upon to carry out any duties as would materially interfere with the member's employment as stated in his application.

(e) The President may assign to duty with the NIDC any officer on the active or inactive list of the regular Army, the Navy, the Marine Corps, the National Guard and/or the Officers' Reserve Corps, and an officer of the regular Army in each corps area shall be designated as an officer in charge of NIDC, whose duty under the corps area commander shall be to provide for cooperation between the members of the NIDC within their local area; to instruct the members of NIDC in their voluntary duties and to provide for them plans for carrying out their objectives in detecting and reporting acts of sabotage and sedition and in suppressing armed insurrection against the Government; and to provide for reports upon the activities of NIDC within the area and afford liaison and cooperate with the Federal Bureau of Investigation, local peace officers and other appropriate agencies of the government.

(f) A member of the NIDC shall not be exempt by reason thereof or because of anything contained in this Act from being drafted into the Federal service under any selective service act now or hereafter in existence. Upon voluntary enlistment or other form of induction into the military or naval service of the United States, membership in this body shall at once terminate.

of directors of the American Petroleum Institute. Resources, facilities, services, and personnel of the industry were offered for voluntary and effective mobilization, and the further pledge was made of the industry's ability to furnish a complete,. adequate, and continuous supply of petroleum and its products, both for military and civilian requirements.

In a second resolution also adopted unanimously the board approved in principle a pending amendment to the National Defense Act authorizing a special militia to be known as the National Industrial Defense Corps. The board adopted a third resolution rescinding its action of April 19, 1938, creating a Committee on Public Relations and calling for the dissolution of public relations committees and organization resulting therefrom.

The resolution pledging the industry's cooperation with the government for national defense follows:

"The American petroleum industry pledges its full, complete, and voluntary cooperation with the government of the United States, and with all agencies of the government, in the furtherance of national defense and security.

"The resources, the facilities, the services, and the personnel of the industry can be voluntarily and effectively mobilized in a cooperative program of government and industry for national defense, and the industry pledges, with confident assurance, its ability to furnish a complete, adequate, and continuous supply at all times, wherever desired, of petroleum and its products, to the fullest requirements of the military and naval establishments of the United States, as well as the industrial and civilian requirements of the nation."

The resolution endorsing in principle the NIDC follows:

"In order to combat the conditions portrayed by the President in his public address to the citizens of the United States on the evening of May 26, 1940, and in order to afford an opportunity for innumerable American citizens to make a real, practical contribution to effective national defense, the American Petroleum Institute approves in principle the pending amendment to the National Defense Act, introduced by U. S. Senator Morris Sheppard, of Texas, and authorizing a new special militia in the War Department to be known as

the National Industrial Defense Corps."

The resolution ending the program of public relations which has been carried on by the Institute explained that "in view of changed conditions in the country and in the industry it now appears undesirable for the Institute to engage in a general campaign such as was contemplated when the original action was taken." The resolution provided that the Institute's Department of Public Relations shall function as it did prior to creation of the larger committee organization now discontinued.

The board devoted considerable time to the war situation and to the expected responsibilities of the industry and its possible contributions to national defense.

### Hulen Stresses Preparedness

Lieutenant General John A. Hulen, retired, urged preparedness in addressing the only general session at the meeting. He pointed out the vast amount of time required to train soldiers and to train officers who could train men, etc. However, all this should be done before an acute war emergency arises, Hulen continued.

Turning to "fifth columnists," Hulen pointed out the large foreign population from many countries in the United States and the excellent services saboteurs and traitors have performed for Germany. "The bill (NIDC) proposed seems to me," he asserted, "to provide a way to fully investigate such persons and in a way nullify the designs of an enemy espionage net and of enemy sympathizers.

Hulen further declared that "it seems to me what it attempts to accomplish is the very first thing that we ought to do, even though we are not in a war emergency, for, if we put such a problem off, we might find ourselves occupied with so many other emergency problems that this one would not be handled in the most efficient way."

### Oil Demand Favorable

So far as overall demand for its products is concerned, the petroleum industry was declared to be in a favorable position by W. R. Boyd, Jr., executive vice president of the American Petroleum Institute, in a released statement, which reads as follows:

"Total demand was up 6½ percent in 1939 and for the first quarter of 1940 exceeded the like quarter of last year by 6.7 percent,

## PETITION

## For Urging Congress to Enact National Industrial Defense Corps Bill

***(Anyone desiring to do so should forward petitions immediately to their respective Senators and Congressmen)***

TO THE CONGRESS OF THE UNITED STATES:

WHEREAS, the President of the United States, on the evening of May 26, 1940, publicly warned the American people:

> "That the threat to our national security is not a matter of military weapons alone;
>
> "That the Trojan Horse and the Fifth Column are new methods of attack that betray a nation unprepared for treachery;
>
> "That spies, saboteurs, and traitors are the actors in this new strategy;
>
> "That there is an added technique for weakening a nation at its very roots and for disrupting the entire pattern of the life of our people by creating discord;
>
> "That as a result of these new techniques, armament progress may be dangerously delayed and the unity of the State so sapped that its strength is destroyed;
>
> "That new forces are being unleashed, deliberately planned to divide and weaken us, and that these dividing forces are undiluted poison;
>
> **"That with all of these we must deal vigorously;** and
>
> "That the development of our defense program makes it essential that each and every one of us feel that we have some contribution to make toward the security of our country;" and

WHEREAS, after careful study of the national defense plan as provided for in our National Defense Act, it has become evident that, in order to combat the conditions recited by the President and to afford an opportunity for innumerable American citizens to make a real, practical contribution to our national defense, that it is necessary to amend the National Defense Act by adding thereto Section 81-b providing for a new special militia of our citizenry, to be known as the National Industrial Defense Corps, and which, without expense to the National government, can enlist millions of men engaged in industries essential to the National defense, who can serve in many aspects of National defense most effectively, while still fully engaged in their private occupations and employment and yet afford, under leadership of a competent officer personnel, that supplementary force to the organized military establishment so tragically needed in foreign countries suffering from organized treason and disloyalty within their own borders; and

WHEREAS United States Senator Morris Sheppard, of Texas, has introduced such an Act to amend the National Defense Act by adding thereto Section 81-b, providing for a National Industrial Defense Corps, before the Military Affairs Committee of the United States Senate, and hearings have been and will be held in relation thereto by the Military Affairs Committee of the House of Representatives and the Senate of the United States Congress;

WHEREAS Lt. Gen. John A. Hulen has fully endorsed this Amendment of the National Defense Act by creating a National Industrial Defense Corps, and has expressed his considered judgment that "from experience I feel such an organization is eminently necessary and will rapidly bring about the orderly restriction and control of subversive activities;" and

WHEREAS we desire to register our carefully considered approval of the National Industrial Defense Corps, and to record our unqualified judgment with respect to the urgent and immediate need for such a National Industrial Defense Corps;

We respectfully subscribe our names and addresses to this petition to the Congress of the United States to take prompt and immediate action in the enactment of this legislation so vital to the United States Defense.

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though it would be dangerously optimistic to expect that this rate of increase will continue.

"Stocks of individual products are at reasonable economic levels in almost every instance with the exception of gasoline. Crude oil stocks, while lower than the year before, are somewhat higher than their 1939 low. Inventories of lubricating oils and greases are approximately what they were a year ago.

"As a result of the necessity of supplying . substantially larger number of home-heating oil burners during the past extremely (and abnormally cold winter the industry was compelled to produce unneeded gasoline, which has resulted in uneconomically large gasoline inventories and materially reduced light and heavy fuel oil and kerosene stocks.

"No doubt the industry will profit by the experiences of the past winter in its approach to the question of necessary supplies of furnace oils for next winter by taking increased yields of light fuels during the coming summer as well as higher yields of other products, the inventories of which are now low.

"If the yields of the fuel products are increased without augmenting runs to stills then adequate supplies will be accumulated at the same time that gasoline inventories are drawn down, thus resulting in a better balanced situation.

"The oil industry is never static. Trends often change very rapidly, and much will depend upon the actual level of crude oil production in the near future, and the attitude of the regulatory bodies with respect to the question of waste incidental to the production of crude oil in excess of the reasonable market demand therefor.

"Earlier many thought that, as a result of hostilities abroad, our export shipments would experience a considerable increase. That this, so far at least, has proven erroneous is indicated by the fact that our total exports of both crude oil and refined products during the first seven months of the war were just about 10,000,000 barrels less than in the comparable seven months period—a decline of about 10 percent. The greatest decreases were experienced in gasoline and heavy fuel oils. Exports of lubricating oils and greases have, however, shown an increasing trend.

"Presupposing then that the regulatory bodies recognize the various strong and weak points in the supply and demand position of petroleum, it appears that the industry's job during the coming summer is to replenish the inventories of products where necessary, while withdrawing larger than seasonable amounts from gasoline storage. If this occurs, a trend toward a more nearly balanced inventory position should develop. If it does not, no great amount of imagination will be required to foresee the consequences."

### Demand Changes Suddenly

Typical of the sudden changes in demand with which the petroleum industry is often confronted is the light fuel oil situation of the past heating season, Fred Van Covern, director of the Institute's Department of Statistics, pointed out in a prepared statement. Measured in terms of degree days, last winter was 13 percent colder than the previous winter and about 2 percent colder than the 10-year averages on which Weather Bureau normals are based. As a result of this extremely cold weather, unusually large quantities of light fuels had to be produced in order to supply the unexpected demand, even though inventories were drawn to a minimum.

"It now appears that in the process of making the 6,000,000 barrels of additional furnace oils required, approximately 16,000,000 barrels of gasoline had to be produced and added to inventories already high," Van Covern said. "Saying it another way, if the industry had had 44,000,000 barrels of gas oil and distillate fuel in storage on September 30, 1939, instead of 38,000,000 barrels (28,000,000 at refineries and 10,000,000 at terminals) it would not have been necessary to have produced the difference during the past winter season, and the amount of gasoline (16,000,000 barrels) that had to be made coincident with the production of that much furnace oil would probably not now be in storage.

"In looking ahead toward next winter," he continued, "there are a number of interesting points that one might spend a little time thinking about. During the first quarter of this year there were approximately 40 percent more home-heating oil burners sold than in the corresponding quarter of 1939. During the entire year of 1939 there were approximately 248,000 burners sold, an increase of 23 percent above the 202,000 sold in 1938. My studies of these figures and other related information indicate that sales of new domestic burners during 1940 may total between 275,000 and 300,000, and that this trend could continue during the first quarter of 1941. Applying a replacement ratio of about 15 percent, and the fact that during the past winter there were approximately 1,900,000 burners in use on an average over the entire period, I come to the conclusion that there will probably be an average of 2,150,000 of these burners in use during next winter, an increase of about 13 percent.

"Should the coming winter prove to be one of normal temperatures, that is, the average of the past ten winters, gas oil and distillate fuel oil demand will probably be about 108,000,000 barrels, or about 9 percent greater than during the past winter.

"Should it be an exactly similar winter from the temperature point of view as last winter, which was colder than normal, the total demand for these oils will probably approximate 112,000,000 barrels, or about 13 percent greater.

"Under these circumstances, the 38,000,000 barrels of gas oil and distillate fuels in storage at refineries and at terminals on September 30, 1939, would again prove inadequate. It is my opinion that 48,000,000 barrels of these oils in storage at refineries and terminals on September 30th next would result in more economic stock levels during next winter and prevent a scarcity of supply such as threatened in certain areas during the past winter."

### Institutional Advertising

Institutional advertising should be adopted by the petroleum industry as established policy and a well-planned advertising program faithfully carried through, it was recommended by Paul Truesdell, of Universal Oil Products Company, Chicago. Truesdell told the Public Relations group session of the Institute that "the same advertising, merchandising methods that so effectively have sold our products, just as effectively can sell the industry, its policies, its achievements, its leaders, and its honesty."

The petroleum industry is doing a good job for the people it employs, for those who distribute its products, and for consumers, farmers, and other industries, said Truesdell, but the people do not fully appreciate the situation be-

[*Continued on page 52*]

# A Review of the Principles of Oil Reservoir Performance

By T. V. MOORE
Humble Oil and Refining Company, Houston, Texas

**PRODUCTION of oil is accomplished by displacing the oil from the pores of the sand with either gas or water. In any case, some oil is left in the sand, because sands which contain only a small amount of oil do not transmit oil readily through their pores. Less oil is left in a sand from which oil has been displaced by water drive than would be left by a gas drive. In water-drive fields it is important that the production be slow enough to permit the water to flood the fine as well as the coarse sands. Gas caps should not be permitted to decrease in size due to production at excessive gas-oil ratio. Wells are important mechanical units, and must be completed properly and kept in proper repair. A number of strategically located wells is necessary to provide for adequate control of the displacement of oil by water or gas, but otherwise the number of wells drilled is of minor importance.**

**This paper was presented to Division of Production, before the Tenth Mid-Year Meeting of the American Petroleum Institute, at the Blackstone Hotel, Fort Worth, Texas, May 29, 1940.**

THE art of petroleum production, in some of its branches, has been developed to a high degree of perfection, principally because of the ingenuity and the skill of the petroleum engineer in applying the sciences of mechanics and metallurgy to the problems with which he has been confronted. Less progress has been made in that important phase of production dealing with the control of forces which move oil to the wells and which govern the efficiency with which oil is recovered. Slow technical development along these lines has been due to the limited knowledge of the fundamental physical laws of the movement of fluids in oil reservoirs. Some of the early geologists enunciated important principles which might have served as a basis for the development of sound conceptions of the mechanism of petroleum production[1] had not the technical talent within the industry devoted its efforts entirely to improvements in equipment and in the practice of drilling wells and of lifting oil to the surface. Knowledge of how oil travels from the reservoir to the wells was nearly extinguished during a dark age lasting about 30 or 40 years. The renaissance came slowly, beginning with the early work of the petroleum engineers of the Federal Bureau of Mines, and only recently has the work proceeded at a sufficiently rapid rate to indicate that the understanding of the fluid mechanics of oil reservoirs can be applied to the practical problem of obtaining increased recovery of oil.

### Conditions Necessary for Production of Oil

It has been pointed out that at least two conditions are necessary to permit the production of oil from wells:[2] 1, the oil must be displaced from the rock by some other fluid, either gas or water; and, 2, a pressure gradient must be set up between the rock yielding oil and the well bore. These conditions are general and fundamental, and must be considered in evaluating the performance of oil reservoirs. Usually, the recovery of oil from a reservoir is limited by the extent to which the oil can be displaced by another fluid, and for this reason it is important to investigate the fundamental mechanism of oil displacement.

The permeability of a sand to a particular fluid † depends upon the saturation ‡ of the fluid.[3, 4, 5, 6, 7] At low saturations, the permeability to any single fluid approaches zero; and it is impossible, by any practical method, to reduce the saturation below the point at which the permeability of the sand to that fluid is negligible. With respect to oil, this means that some oil always is left unrecoverable in the sand—the amount of unrecoverable oil depending primarily upon the physical properties of the oil, gas, and water, and the relative amounts of water and gas in the sand at depletion. It has been determined[7] that, when oil has been displaced with gas, the residual-oil saturation is high, because the viscosity of gas is so low compared with the viscosity of oil that the gas readily can bypass the oil remaining in the sand. On the other hand, if the oil be displaced with water, the residual-oil saturation may be much lower.

Leverett[8] has used the triangular diagram to illustrate the relative efficiencies of gas and water as displacing media for oil. This diagram is an equilateral triangle, any point within which represents a definite saturation of oil, water, and gas—the saturation of any fluid being proportional to the distance of the point from the corresponding base line. Such a diagram is illustrated in Figure 1. The corner **O** of the diagram would correspond to a sand completely filled with oil; the corners **W** and **G** represent sand completely filled with water and gas, respectively. A point on the side **OW**, midway between the corners **O** and **W**, would represent a sand containing no gas, but equal amounts of oil and water. A point in the exact center of the diagram represents a sand whose pore spaces are filled with equal volumes of water, oil, and gas. The perpendicular distance from any point to the base line **WG** is proportional to the amount of oil in the sand. The limiting amounts of oil which the sand must contain in order to permit flow of oil at appreciable rates can be determined experimentally, and are represented in the diagram by the line **XY**. The area **OXY** represents all the combinations of water, oil, and gas saturations at

†Permeability, as strictly defined, is a property of a rock which measures its ability to permit a fluid to flow through the pores of the rock. However, the rate at which any particular fluid flows through a rock under a specified pressure gradient depends not only on the permeability of the rock, but also on the viscosity of the fluid and the amount and kind of other fluids which also may be present within the pores of the rock. In this paper the phrase "permeability to a particular fluid" refers to the ability of the sand to transmit that fluid under the conditions of saturation prevailing in the pores of the rock.

‡Saturation is defined herein as the ratio of the volume of the fluid to the volume of the total pore space of the sand within which it is contained.

which oil will flow in appreciable volume, i.e., from which oil may be recovered. The area **WXYG** represents the saturations at which the flow of oil is negligible.

### Efficiency of Displacement of Oil

The point **A**, in Figure 1, indicates the condition of a small portion of a typical oil-bearing sand prior to production of oil. The saturation of oil within the sand is proportional to the length of the line **AA'**—the remainder of the pore space being filled with interstitial, or connate, water, and the amount of interstitial water being indicated by the distance from the line **OG**. If oil is to be produced from the sand by

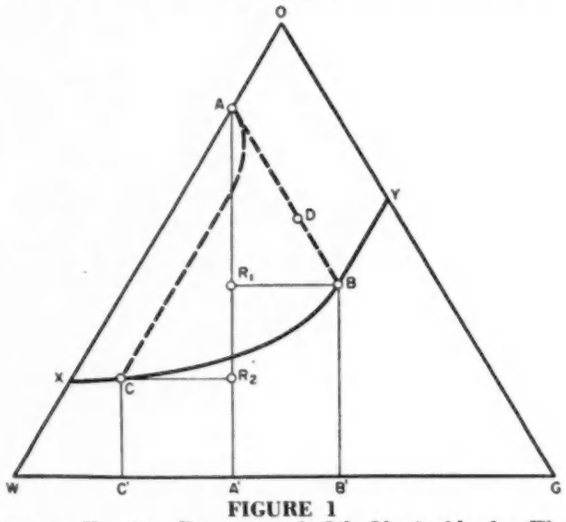


**FIGURE 1**
**Diagram Showing Recovery of Oil Obtainable by Water Drive and by Gas Drive.**

gas drive alone, the water saturation of the sand substantially will remain unchanged during the course of production, but the gas saturation will increase as the oil saturation decreases. Accordingly, the changes in saturation which occur will be indicated by the line **AB**. At the point **B**, the permeability of the sand to oil is so low that the gas no longer can displace any appreciable quantity of oil; and the oil left in the sand at that point, represented by the line **BB'**, is unrecoverable by gas drive. The oil recovered is the difference between the oil originally in the sand and the residual oil, or is equivalent to the length of the line $AR_1$. If a limited amount of gas is available, as in the case of a sand from which oil is produced by the release and expansion of the dissolved gas alone, the gas may be exhausted before all the recoverable oil has been produced—in which case production would cease at a point **D**, instead of being continued until the point **B** had been reached. If this should occur, the supply of additional gas to the sand by repressuring would result in additional oil recovery.

If water is available to flood the sand, the residual-oil saturation will be materially less than if the oil is displaced by gas alone. To illustrate this condition, the path **AC** shows the changes in saturation that would occur in a typical case of water drive. Because usually the pressure must be lowered somewhat before water enters the sand, a little gas may come out of solution and remain in the pore spaces of the sand. This is responsible for the fact that the saturation traverse does not follow the line **OW**, but is displaced slightly to indicate the presence of gas in the sand. At high water saturations, the limit of oil flow occurs at much lower residual-oil saturation than at high gas saturations. In other words, water drive is a more efficient method for recovering oil than is gas drive. In the diagram the line **CC'** represents the residual-oil saturation under water drive, and the line $AR_2$ the amount of oil recovered.

Of course, the exact recovery obtainable varies widely for each individual condition; but, for a typical case, the following approximate saturations at depletion may be cited as an example:

| | (Figures in Percent) | | |
|---|---|---|---|
| | **Oil** | **Water** | **Gas** |
| Initial saturation | 80 | 20 | 0 |
| Residual saturation under incomplete gas drive | 50 | 20 | 30 |
| Residual saturation under complete gas drive | 35 | 20 | 45 |
| Residual saturation under uniform water drive | 20 | 70 | 10 |

The recoveries expressed as percent of the oil originally in place and as barrels per acre-foot, assuming a porosity of 25 percent and that a barrel of oil as measured at the surface has a volume of 1.2 barrels in the reservoir, are given below:

| | **Percent Recovery** | **Barrels per Acre-Foot** |
|---|---|---|
| Incomplete gas drive | 25 | 320 |
| Complete gas drive | 48 | 610 |
| Uniform water drive | 75 | 970 |

It must be remembered that these figures are illustrative only, and can be used only for the specific case to which they are applicable. Likewise, these recoveries apply to the particular portions of the sand from which oil may be displaced by the mechanism indicated, and not to the entire field.

### Displacement of Oil Under Water Drive

Because of the higher recovery obtainable by displacing oil by water instead of by gas, it is desirable, whenever possible, to produce oil under a water drive. Water underlying the oil in the reservoir tends to enter the oil-bearing zone whenever the pressure has been lowered by production. The rate at which water enters depends upon the pressure differential between the water-bearing sand and the oil reservoir, the permeability and thickness of the water-bearing sand, the size and shape of the reservoir, and the source of supply of the water[8]. One effect of water encroachment is to maintain the pressure in an oil reservoir—the degree of pressure maintenance depending upon the rate of withdrawal of oil, gas, and water. A careful study of the relationship between production and reservoir pressure often permits the estimation, with reasonable accuracy, of the rate at which water enters the field.[9, 10] There is always a limited range of production rates beyond which water drive is not appreciably effective in maintaining pressure. At the higher rates the behavior of the field resembles closely that of a gas-drive field. Accordingly, the reservoir pressure is an excellent index to the activity of a water drive; and, if full advantage in securing maximum oil recovery is to be obtained from a water drive, oil should not be withdrawn at rates so fast that the encroaching water will not maintain the pressure.

The maintenance of pressure alone, however, does not insure the efficiency of a water drive. This is due to the fact that the permeability of sand in a continuous sand body usually varies[11]; and, at high

rates of flow, the relative rate of displacement of oil by water in sands of different permeability is nearly proportional to the permeability.[12] Therefore, at high rates of flow, there is danger that the oil in the finer and less permeable sands will be trapped by water moving more rapidly through the coarser sands.[13] At low rates of flow, capillary and gravitational forces become important in maintaining a more uniform advance of water through sands of varying permeability.[14] Thus, if a complete flooding of all sands is to be obtained, the rate of withdrawal must be controlled to the extent that the rate of water encroachment will be sufficiently low to permit the entrance of water into the finer and less permeable oil-bearing sands.

It was believed formerly that the capillary forces acted primarily along the path of flow, the pressure developed by capillary action being superimposed upon the pressure gradient due to friction in flowing fluids.[12] It is recognized now that the capillary pressure is too small to affect materially the rate of flow by such a mechanism alone. However, recent work has indicated another mechanism of flow under the influence of capillarity, which explains satisfactorily the fact that these comparatively small forces may be sufficient to keep the advance of water relatively uniform in sands of varying permeability. There is a definite relationship between capillary pressure and fluid content.[15] (Capillary pressure is used herein to mean the difference in pressure between the fluid phases in the same element of sand.) In a sand containing both water and oil, the capillary pressure on the oil increases as the water saturation of the sand decreases. In a sand zone in which water is displacing oil, the water tends to displace oil more rapidly from the more permeable sands in which the frictional resistance to flow is least. This substantially lowers the capillary pressure on the oil in such sands, but the capillary pressure on the oil in the adjacent sands of lower permeability which have not been flooded by water is about equal to its original value, and is substantially higher than the capillary pressure in the flooded sands. As a result, the oil tends to migrate from the less permeable to the more permeable sands, being replaced by water as it does so. In this connection, it is interesting to note that oil and water may move in opposite directions in the same sand. This phenomenon, which has been called "counterflow," undoubtedly plays an important part in the displacement of oil by water.[16] The transfer of oil from the fine to the coarse sands occurs slowly, but in most cases the area through which flow occurs is so large that great quantities of oil flow; and, therefore, it is possible, at slow but practical rates of flow, to maintain a relatively uniform advance of water through a series of interconnected sands of varying permeability.

It is important to note that the uniform advance of water comes about as a result of movement across, rather than along, the path of flow; and, therefore, it is improbable that capillary forces can bring about uniform displacement of oil from separated sand zones.

### Conservation of Water

Water must be regarded as a source of energy which is fully as important as gas, and which must be conserved with as much diligence. Few fields have a water drive so powerful that the water can be wasted extensively without a serious adverse effect upon the reservoir pressure.[17] There are three general methods of conserving water:

1. Restriction of production from wells producing with high water-oil ratios.
2. Plugging back wells making large quantities of water.
3. Return of water to the sand from which it was produced.

The restriction of wells making large quantities of water is, from the operating standpoint, the most economical method of preventing waste of water; but, because of diverse ownership of the properties in many fields and, to a lesser extent, because the industry has been slow to accept the proposition that water should be conserved in order to prevent waste of oil, there are few fields in which the rate of production of water-producing wells is restricted materially as a conservation measure.

Plugging back wells that make water is practiced widely, primarily to avoid the expense of handling large quantities of salt water. One of the most important problems in plug-back work involves the determination of the optimum time in the life of the well at which to carry out the plug-back operation. An oil-bearing sand will produce substantial amounts of water before all of the recoverable oil has been produced. It should be pointed out that the water produced by a well often is not a suitable index to the condition of the sands open to the well. For example, in one well the entire sand section may be depleted in a fairly uniform manner, so that all of the sand produces some water and some oil. In this instance, the water cannot be plugged off without plugging off the oil also, as far as the particular well is concerned. On the other hand, a well may produce water from a portion of the sand which, being entirely depleted, produces nothing but water, while the remainder of the sand produces pipe-line oil. It is obviously advantageous to plug off the water in this type of well.

The practice of returning water to the reservoir is a comparatively recent development[18]; and, although this practice has not been adopted generally, it has many great advantages, and in the future probably will play an important part in the operation of many water-drive fields.

### Displacement of Oil Under Gas Drive

In considering the function of gas in the production of oil, it is important to recognize that the gas not only is a source of energy, but also a fluid medium which can displace oil from the sand. One of the basic differences between gas and water as a medium for displacing oil is that the oil contains gas in solution which, upon reduction of pressure, is released within the pores of an oil-bearing sand. Thus it is possible to build up the gas saturation and decrease oil saturation without having a body of free gas displace the oil. Because of the low viscosity of gas, the ratio of gas to oil flowing in a sand becomes high at relatively low gas saturation; and, if the supply of gas is limited, it may be exhausted before the recoverable oil has been produced. For this reason, it is desirable to avoid increasing gas saturation within an oil sand. It is preferable to keep the oil remaining in a reservoir concentrated in a part of the sand from which it may be produced at low gas-oil ratios. To do this in a gas-drive field, the released gas should be allowed to collect in the gas cap, which should be allowed to expand continuously and displace the oil. In many cases it may be possible to produce at sufficiently low rates to keep the gas

and oil segregated in this way by gravitational forces, although in other cases it may be necessary to return the gas produced to the reservoir.

The action of gas in an expanding gas cap as it displaces oil from the reservoir in many respects is analogous to the action of water, and many of the same principles applicable to the control of water

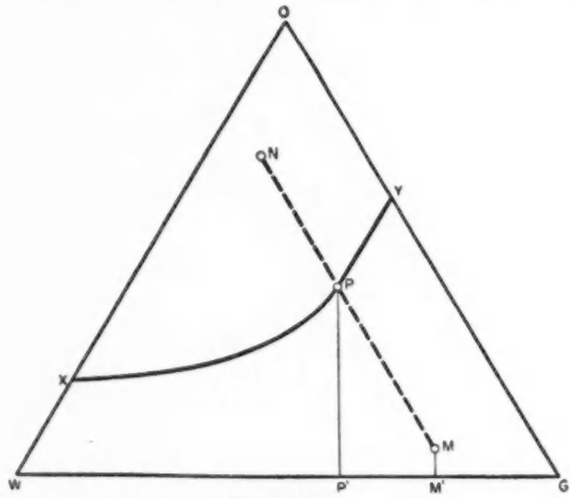


**FIGURE 2**
**Diagram Showing the Loss of Recoverable Oil Due to a Contracting Gas Cap**

also apply to the control of gas. However, in displacement of oil by gas, capillary forces are of less importance, and gravitational forces are of greater importance than they are in the case of displacement of oil by water. A gas cap, if properly controlled, may be of great benefit in obtaining high oil recovery, particularly in fields with weak water drive. The most important functions of the gas cap are to maintain the pressure in the reservoir and to displace the oil in such manner that the remaining oil is confined within a continuously diminishing zone within the sand. For the gas cap to serve these functions properly, it is necessary that the gas be conserved.

Waste of gas from a gas cap can result in a serious loss of oil due to the sands of the gas cap soaking up recoverable oil. This may be demonstrated from the triangular diagram in Figure 2. The point **M** represents the composition of the fluids in the pores of a small element of sand within a typical gas cap. The gas-cap sands retain substantial amounts of interstitial water and frequently a small quantity of oil (in the diagram the oil retained is proportional to the length of the line **MM'**), but the pore space is filled predominantly with gas. The production of excessive quantities of gas from the gas cap will cause the gas cap to contract—oil moving into the space formerly occupied by gas. The result is that, in a portion of the gas-cap sand, the oil saturation will become high, as is indicated by the point **N** in Figure 2. Even though some of the oil which has migrated into the gas cap may be recovered by gas drive, the oil saturation of the sand, as a practical matter, cannot be reduced below that represented by the point **P**, and thus the sand will retain a quantity of unrecoverable oil proportional to the length of the line **PP'**. Of course, if water could be used to displace the oil, the unrecoverable oil retained would be reduced substantially; but, even so, large quantities of oil can be lost as a result of contraction of a gas cap.

The changes in size of a gas cap may be estimated from data on gas and oil production and reservoir pressure by the method of volumetric balance.[9, 10]

The elimination of production of excessive quantities of gas best can be accomplished by careful attention to the completion and repair of wells. In some fields the oil-bearing sands are so thin or so irregular that the gas-oil ratio of the wells cannot be controlled by mechanical means; and, when this is the case, repressuring may be advisable.

## Function of Wells

The wells in an oil reservoir are the important mechanical units through which oil must be withdrawn, and which provide information necessary for the efficient control of the reservoir. In every field there is a zone into which oil naturally migrates under the force of an efficient gas or water drive, and it is within this zone that wells assume their greatest importance. In locating and completing wells, the most important consideration should be the control of the displacement of the oil by gas or water. The number of wells is of minor importance.

## Conclusion

1. The rate of production should be low enough to permit production by water drive rather than by gas drive.
2. The velocity of the displacing fluid should be slow enough to permit the capillary and gravitational forces to maintain a substantially uniform rate of displacement through all oil-bearing sands.
3. When multiple zones of oil-bearing sand are present, the displacement of oil can be carried out most efficiently by producing one zone at a time.
4. The gas and water must be conserved; and, unless the reservoir contains an ample supply of these fluids to provide for the displacement of all recoverable oil, it may be advisable to return at least a portion of the gas or water produced to the reservoir.
5. Production operations should be carried on in such a manner as to keep recoverable oil concentrated in as small a part of the sand as possible.
6. Strategic location of wells, and proper completion and workover of wells and control of production rate, are necessary to the efficient production of oil.

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# Effect of Formation Permeability On Plastering Behavior of Mud

By H. T. BYCK
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**IT frequently has been asssumed that the loss of liquid from drilling mud increases with increased permeability of the formation penetrated. Several recent papers, which present a theoretical analysis of the filtration of muds, point out that this factor should have little or no influence upon mud plastering. The present paper presents extensive experimental data to check this important point.**

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ONE of the factors which is of interest in the analysis of the plastering behavior of rotary-drilling muds and the application of laboratory data to field practice is the effect of the permeability of the formation penetrated during drilling upon liquid loss and sheath thickness.

There is abundant evidence in the literature to show that under normal conditions it is the water of the mud, rather than whole mud, which penetrates the formation. However, there has been a prevalent belief that water loss increases with increased formation permeability, and that lost circulation (loss of whole-mud fluid) takes place when the formation permeability reaches some indefinite high value. Circulation losses have been discussed at some length elsewhere;[1] and this aspect of the problem will not be considered in this paper, which is confined to the region where filteration occurs without mud loss.

It now is conceded generally that the relative plastering behavior of muds in the well is represented adequately by laboratory filtration tests made with filter paper as the filter medium—of course, with due regard to the effect of temperature; and evidence has been presented [2] to show that the plastering behavior of a given mud is very nearly the same when filter paper is used as the filter medium as when sintered alundum filter discs of a permeability of approximately 500 millidarcys are used.

In several recent papers dealing with the plastering properties of muds from a theoretical viewpoint, [3, 4, 5] it is inferred that the rock permeability has little or no effect upon the plastering, but no experimental evidence is presented in this connection. When a single filter medium is used in evaluating the plastering properties of muds, the permeability of the mud sheath has been shown to be the most important factor in controlling the rate of water loss to the formation. The permeability of the sheath (or its reciprocal sheath-resistance co-efficient) is a function alone of characteristics of the mud—its colloid content, degree of dispersion or flocculation, solids content, particle size, etc.

## Experimental Work

Experimental data were obtained on a large mudding-off machine patterned after the Jones and Babson[6] circulating filter press, with the modified core holder for full-size cylindrical consolidated cores, described in an earlier publication.[7] The mud under pressure was circulated over the cylindrical surface of the cores, the mud cake building up on this face, while the filtrate penetrated radially through the core.

Because is was not possible to obtain oil-field cores of sufficiently wide permeability range and suitable mechanical strength for this study, it was decided to use vitreous-bonded aloxite abrasive wheels to represent the formations.

In order to establish the identical behavior of these aloxite cores and oil-field cores toward the muds, several oil-field cores of low and intermediate permeability were included in one series of tests. Results of the runs on these cores were identical with those on synthetic cores, within experimental error.

In the experiments with various mud fluids, the first series with Ventura mud differs from the subsequent ones in that this first set was used to establish the reproducibility of the plastering test, and to show that the aloxite cores were similar to oil-field cores for the purpose in hand. In subsequent series aloxite cores alone were used, and in a few cases single runs were made. In several cases duplicate runs reported here were made on different days, but in general the

**TABLE 1**
**Comparison of Oil-Field and Aloxite Cores—Ventura Mud**

| Permeability of core, millidarcys | 322 | | | | 450 | | 3,000 | | | | 6,300 | | 14,600 | | 600 | | 40 | 10 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nature of core | Aloxite Run No. | | | | Aloxite Run No. | | Aloxite Run No. | | | | Aloxite Run No. | | Aloxite Run No. | | Oil-field Core Run No. | | Oil-Field Core Run No. | Oil-field Core Run No. | |
| | 1 | 2 | 3 | 4 | 1 | 2 | 1 | 2 | 3 | 4 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 2 |
| Filtrate volume, ml in 40 min. | 50.5 | 46.0 | 46.0 | 47.5 | 45.0 | 46.0 | 43.5 | 45.0 | 45.0 | 45.0 | 45.0 | 48.0 | 46.5 | 48.5 | 224 | 225 | 98.0 | 125.5 | 122 |
| Area of core, cc | | | 32.7 | | | 31.0 | | | 30.9 | | | 29.3 | | 31.6 | | 152 | 65.5 | | 76.13 |
| Throughput corrected to area of 322-md core, ml. | 50.5 | 46.0 | 46.0 | 47.5 | 47.5 | 48.5 | 46.0 | 47.6 | 47.6 | 47.6 | 50.3 | 53.6 | 49.7 | 50.2 | 48.2 | 48.3 | 49.0 | 53.6 | 52.4 |
| Average of corrected values, ml | | | 47.5 | | | 48.0 | | | 47.2 | | | 51.9 | | 49.9 | | 48.3 | 49.0 | | 53.0 |
| Sheath thickness, millimeters | 3.8 | 4.0 | 4.0 | 4.1 | 4.0 | 4.0 | 3.8 | 3.8 | 4.0 | 4.0 | 4.0 | 4.1 | 4.3 | 4.2 | 3.8 | 4.0 | 3.8 | 4.0 | 4.0 |

Mud weightlb =75.0 lb. per cu. ft. Circulation at 500 psi. Room temperature.

series with a single mud was completed in one day from a single large charge of mud to the reservoir of the apparatus.

The muds used in this work were standardized at 75 pounds per cubic foot (density=1.200), and were passed through a 70-mesh screen before they were charged to the apparatus. Viscosity and density of the mud were measured before and after the run to assure constancy of the mud properties. No chemical treatment for viscosity reduction of the muds was applied, well-aged muds made with tap water being used.

The permeability of the cores was measured according to standard methods, using dry air as the flowing medium.

As is usual in this type of experiment, the water throughput was measured at 1-minute intervals for the first 5 minutes, and at 5-minute intervals for the remainder of the run—40 minutes. The thickness of the sheath was determined after the core holder had been removed from the apparatus, and after any loosely adhering mud had been washed off with a gentle stream of water.

All experiments were made at a mud pressure of 500 psi—this representing average well conditions—with circulation of mud over the core face. Radial flow of the filterate through the core prevailed.

Inasmuch as the cores were of the same diameter (3 inches), but of different lengths, the measured water throughput in each case was corrected by a factor representing the ratio of the exposed area of the 322-millidarcy core (taken as standard) to that of the core under consideration. These reduced values are used in analyzing the results.

The exceptionally good agreement between the aloxite and oil-field cores, shown in Table 1, is considered sufficient evidence of the similarity in behavior of these two types of core material toward mud fluids. This agreement between the filtrate values for different cores reduced to a common area is more striking in view of the fact that the actual throughputs using oil-field cores are from 2 to almost 5 times the actual throughput with the 322-millidarcy aloxite core.

The permeability of the mud sheath was calculated in every case from data obtained during the run, as follows: the area ($A$) of the sheath was taken as the exposed area of the core; the thickness of the sheath ($X$) was measured at the end of the run, as mentioned previously. The pressure drop across the sheath was taken as the applied mud pressure, and it was assumed that pure water was the flowing medium, with viscosity taken as 0.88 centipoise (25.5° C). The rate of flow of water was taken as the rate rate during the last 5 minutes of the plastering test. Because the total throughput in this interval was small, it was assumed that the sheath thickness did not increase appreciably; and, hence, the thickness at the end of the run is believed to be as suitable a value as can be obtained.

Linear flow through the sheath was assumed, as the thickness of the sheath is small compared to its radius of curvature; it is, in effect, a flat plate.

Substitution of the above data in the familiar expression of Darcy's law permits the calculation of the sheath permeability, as, for example, the following calculation for one run with Ventura mud:

Area ($A$)=32.7 sq cm

Thickness ($X$)=0.399 cm

Rate of flow through the sheath, $\frac{dQ}{dt}$=3.18 ml per 5 min=0.0106 ml per sec

Pressure difference $\Delta P$=500 psi= 34 atmospheres

$$k=\frac{\mu\cdot\frac{dQ}{dt}\cdot X}{A\Delta P}=\frac{(0.88)\ (0.0106)\ (0.399)}{(32.7)\ (34)}=0.00000343=3.43\ (10^{-6})\ \text{darcys.}$$

The theoretical considerations earlier referred to in this paper, which lead to the conclusion that formation permeability is without appreciable effect upon the plastering properties of muds, have been confirmed experimentally.

Representative muds without chemical or other treatment are found to give the same water loss and mud-sheath thickness on cores of widely different permeabilities.

The sheath permeability calculated for each experiment (see Table 2) was found to be independent of, and several orders of 10 smaller than, the core permeability. Inasmuch as, in the theoretical expressions for plastering, the rock permeability enters this one term as the ratio of filter cake to core permeability, it is seen that this term becomes vanishingly small for the conditions of the present set of experiments.

The range of formation permeabilities over which normal mud plastering, rather than lost circulation, takes place has been extended to cover most of the formations penetrated during drilling. Numerous experiments with unconsolidated sands, reported elsewhere[8] and confirmed in these laboratories, indicate that with these media cement slurries cannot be forced into the pores for any appreciable distance.

Such results cast grave doubt upon the ability to force either cement slurries or whole mud into homogeneous formations; and it appears necessary to conclude that the appearance of mud or cement in wells adjacent to the one under consideration can take place only through crevices, channels, fractures, or caverns, or through formations of extraordinarily high permeability—in fact, only through formations in which the pore sizes are so large as to cause the concept of permeability to lose its generally accepted meaning.

**TABLE 2**
**Summary Data of Various Muds on Series of Cores**

| Permeability and Nature of Core | Average Water Throughput at End of 40 Min. (Milliliters) | | | | |
|---|---|---|---|---|---|
| | Mojave | Ventura | Coalinga | Palos Verdes | Lebec |
| 322-md aloxite | 69.0 | 47.5 | 23.0 | 22.0 | 15.2 |
| 450-md aloxite | 75.4 | 48.0 | 25.3 | 23.2 | 13.8 |
| 3,000-md aloxite | 69.4 | 47.2 | 22.0 | 23.3 | 13.2 |
| 6,300-md aloxite | 77.4 | 51.9 | 25.7 | 22.1 | 13.9 |
| 14,600-md aloxite | 74.5 | 49.9 | 25.5 | 23.3 | 17.3 |
| 600-md oil-field | .... | 48.3 | .... | .... | .... |
| 40-md oil-field | .... | 49.0 | .... | .... | .... |
| 10-md oil-field | .... | 53.0 | .... | .... | .... |
| Average of runs on all cores | 73.5 | 49.0 | 24.3 | 22.6 | 14.6 |
| Average sheath thickness, millimeters | 5.28 | 3.99 | 2.85 | 2.83 | 2.01 |
| Permeability of sheath, darcys | $7.42(10^{-6})$ | $3.43(10^{-6})$ | $1.28(10^{-6})$ | $1.5(10^{-6})$ | $0.46(10^{-6})$ |

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# Prevention and Removal of Paraffin Accumulations

By W. Y. BROWN
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**WAYS and means now popularly employed in the oil-producing areas of the United States for both *preventing* and *removing* paraffin accumulations are discussed, with particular reference to new and improved techniques which have appeared during the past decade. The problem is considered only from the producer's standpoint, which includes both prevention and removal of the waxy deposits laid down by most crude oils in their movement from an underground reservoir to lease storage tanks. The study is founded on the opinions and facts furnished by individuals and companies in reply to a questionnaire which recently was circulated to producers throughout the industry under the sponsorship of the Institute's Eastern District Topical Committee on Production Practice.**

**This paper was presented to Division of Production, before the Tenth Mid-Year Meeting of the American Petroleum Institute, at the Blackstone Hotel, Fort Worth, Texas, May 30, 1940.**

**The statements and opinions expressed herein are those of the author, and should not be construed as an official action or opinion of the Institute, nor of this publication.**

THE prevention and removal of paraffin accumulations insofar as it pertains to the production of crude petroleum will be discussed herein with the idea of bringing down to date a listing of those methods most popularly employed by the oil producers of the United States in dealing with this production problem. As a recently completed questionnaire survey sponsored by the Institute, which received widespread response, is used as a foundation for this study, the information herein embodied should present a reliable picture of the paraffin problem, and should point out accurately the techniques most generally used for both prevention and removal of crude-wax deposits. Inasmuch as the selected scope in this discussion is broad, covering general conditions throughout the industry, only those techniques recently developed or improved will be considered in any detail. Those older better-known practices still being followed merely will be recognized. It is intended that a better understanding of today's paraffin problem and its solutions, as well as the generally accepted characteristics and causes of the deposition, be brought to light in the following analysis of the survey data.

Before entering into the details of the characteristics and causes of the deposit or the methods used for prevention or removal, a few general statements regarding the present status of the paraffin problem are desirable. In the first place, the severity of the paraffin accumulations found today, both in oil wells and in the surface equipment associated with them, is very nearly equal in magnitude to that experienced by operators 10 years ago. Little net progress in *preventing* the accrual of wax deposits in or on producing equipment has been noted. Although considerable benefit has been derived from free-gas conservation and from steps taken to retain in crude oil more of its lighter volatile ends, the simultaneous growth of restrictive production laws and policies, in a rough degree, equally has aggravated paraffin deposition. Measureable advancement has occurred, however, along the lines of *removing* the waxy deposits. This is best indicated by referring to the survey response to this question: "In your opinion, has anything really constructive been done in the last 10 years toward simplifying the petroleum-paraffin problem in producing oil fields?" Of those answering this question, 40 percent reply in the negative. The remaining 60 percent qualify their affirmative opinions by mentioning from 1 to 3 channels in which advancement has occurred. Integration of the qualifying remarks shows the following: Improvement in scraping tools, 49 percent; increase in efficiency of solvents and softeners, 33 percent; amendment of production practices, 9 percent; and developments in the use of heat, back pressure, etc., 9 percent. This analysis bears evidence that the general trends have been in the direction of removing the deposit rather than preventing it, and that the developments and improvements have been localized fairly well to mechanical scraping methods and wax solvents or softeners.

Although the survey presents a miscellaneous assortment of cost data, it is difficult to compare removal methods in the various fields on an expense basis. This is accountable to sizable variations in wage scales, field labor organization, well depths, production rates, tank sizes, oil values, weather conditions, etc., which occur from pool to pool—and even from lease to lease. The cost figures do exhibit, however, that the possibilities of new removal techniques replacing those now employed in most fields is exceptioinally small, as almost invariably the expense of present methods is low enough very nearly to eliminate competition from the standpoint of economy by newly developed schemes. As the cost of a removal method is practically always the cardinal premise by which its selection or rejection is governed, the general tendency—particularly in newly developed pools—is in the direction of simplified methods whose successful adaptation necessitates a minimum of labor and equipment.

## Characteristics and Causes

As a groundwork preparatory to discussing the various methods now employed for preventing and removing paraffin accumulations, a brief review of the physical characteristics and composition of those waxy masses normally encountered in petroleum-pro-

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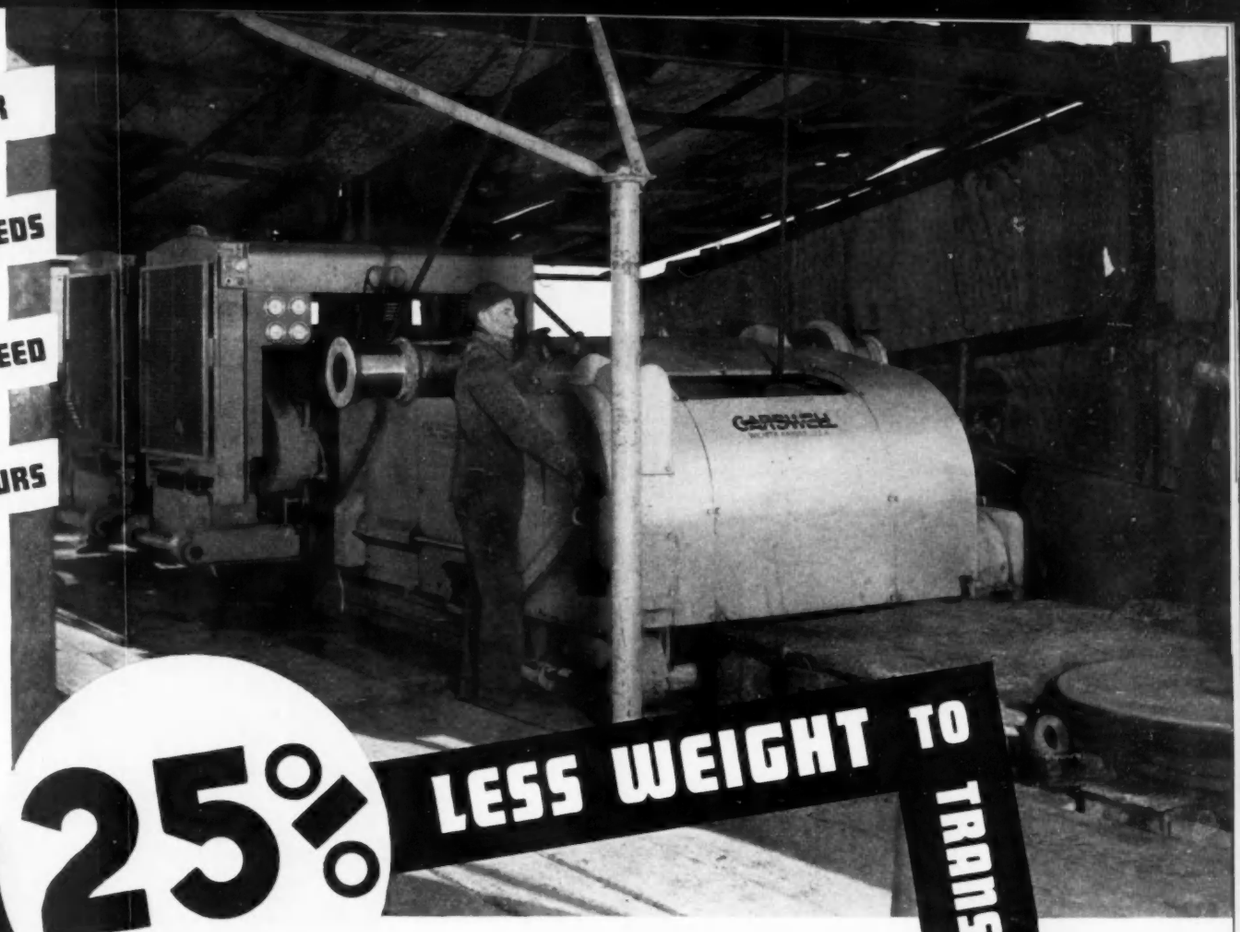

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The sand line drum is interchangeable with the cathead shaft assembly, making a double drum draw works available.

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Send for complete information and price on this new draw works; or see your nearest "Cardwell" direct factory representative.

CARDWELL ALL STEEL

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THIS TRADE MARK INSURES HIGHEST QUALITY AT LOWEST PRICE

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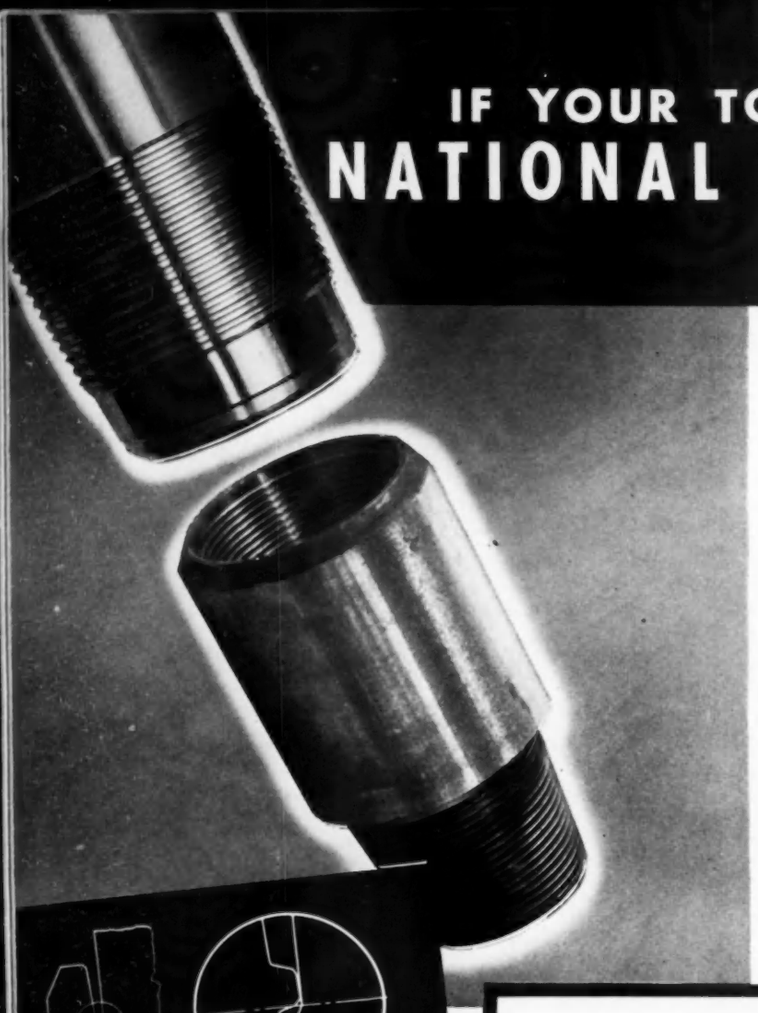
# IF YOUR TOOL JOINTS ARE NATIONAL SHRINK THREAD THEY ARE . . .



## NATIONAL SHRINK THREAD TOOL JOINTS HAVE . . .

## *5 Major Advantages*

1. **Elimination of the necessity of shop replacement.**
2. **Elimination of pipe failure at the last engaged thread.**
3. **Elimination of galled pipe threads.**
4. **Elimination of the hazards of field welding.**
5. **Elimination of leakage and washouts.**

ENLARGED SECTION SHOWING ENGAGEMENT DETAILS

## THE SHRINK THREAD DESIGN PROVIDES AN *Improved* PIPE

to tool joint connection with a number of advantages. Instead of a weakened section in the region of the last engaged pipe thread due to the notch effect of the conventional V-type thread, it has, as illustrated, a coarse square thread with the bottom of the last thread larger in diameter than the drill pipe. This effectively eliminates last engaged thread failures.

It is impossible to gall the Shrink Thread connection during application. Absolute gauging and uniform make-up along with the proper shrinking interference entirely prevent such a possibility. The threads will always be found in perfect condition for field replacement.

Because the pipe threads are always in perfect condition and there is no bucking-on or welding the chances of improper field application are reduced to a minimum.

Leakage and washouts are entirely eliminated by an inside seal located, as shown in the illustration, where it cannot be damaged or battered in operation.

For more complete information about National Shrink Thread Joints see your nearest National representative.

EXECUTIVE OFFICES
PITTSBURGH, PENNA.

•

GENERAL SALES OFFICE
TOLEDO, OHIO

THE NATIONAL

# Replaceable in the Field

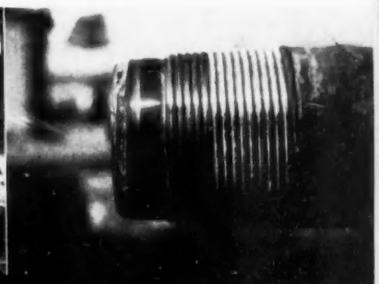
**● It costs money and takes time to truck a drill pipe string to a shop for joint replacement. Many operators are avoiding this expense by using National Shrink Thread Tool Joints with Standard Seamless Shrink Thread Drill Pipe.**

**No threading lathe or bucking on machine is required for replacing these joints. The work is done quickly and economically on the location as shown in the accompanying illustrations.**

Old tool joint is first cut in half at thickest section of metal.

A longitudinal cut is next made with a slot at end for inserting wedge.

Using wedge as a handle, the loosened joint is unscrewed.



Drill pipe after joint removal showing perfect condition of seal and threads.

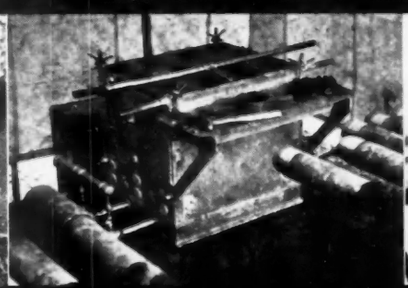
Pipe threads are cleaned with an electric wire buffing wheel preparatory to applying new joint.

New tool joint is applied cold to drill pipe to gauge made-up position.

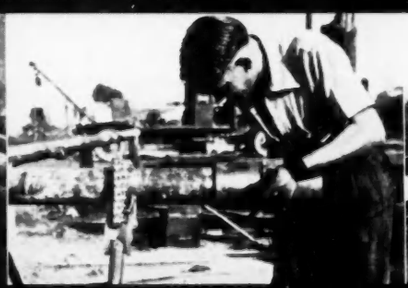
Cold position is gauged to establish a reference mark to indicate made-up position.

Made-up position is gauged by placing one end of the template at the "Cold Position" mark.

The joint is loaded in a portable furnace for heating to 650° F.



The furnace shown in closed position for heating joints.



The heated tool joint is freely screwed on the pipe to made-up position after which the assembly is cooled in the air.

A typical field application set-up during cold or windy weather. A tent is always carried for such conditions.

**Field Replacement Service Under NATIONAL Supervision is *NOW* Available from Points Convenient to All Active Areas**

# NATIONAL SUPPLY COMPANY

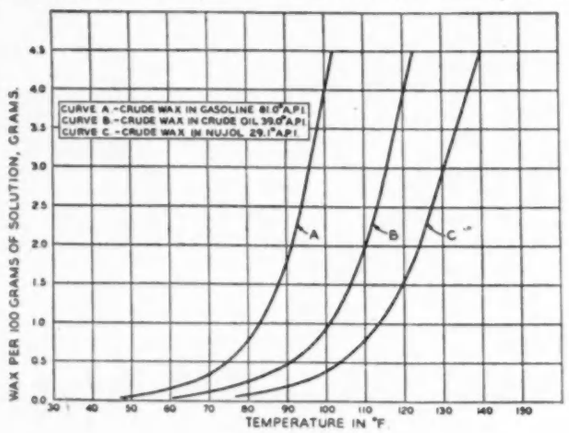
DIVISION OFFICES
FT. WORTH, TEXAS
TULSA, OKLA.
TORRANCE, CALIF.

**TABLE 1**
**Analyses of Some Crude-Paraffin Samples**

| Field and State | Melting Point °F. | PERCENT BY WEIGHT | | | | |
|---|---|---|---|---|---|---|
| | | Silt, Sand, Water, Etc. | Oil | Wax | Gums and Resins | Asphaltic Material |
| Panhandle, Texas | 141.2 | 7 | 23 | 54 | 15 | 0.5 |
| Clay District, W. Virginia | 161.9 | 2 | 31 | 50 | 15 | None |
| Bradford, Pennsylvania | 132.1 | 9 | 30 | 52 | 7 | 0.1 |
| Salt Creek, Wyoming | 154.6 | 15 | 32 | 41 | 9 | 1.9 |

duction practice, and an enumeration of the factors promoting the occurrence of the accumulations, should be made. Table 1 [1] identifies quantitatively the constituents found in some crude-paraffin samples, and indicates their respective melting points.

It can be observed that deposits of crude paraffin differ considerably in melting point, consistency, and composition. As the solubility of various wax fractions in crude oil decreases with an increase in melting point, the highest melting-point waxes in a given crude oil would be expected first to separate from solution with the oil. Hence, paraffins deposited in wells or surface equipment on properties in the same field might differ widely in melting point due to variations in the conditions which promoted wax precipitation. Also paraffins may vary from a soft mushy liquid to a hard granular solid—depending, chiefly, on the amount of oil present in the mass which, in turn, is governed by the age of the deposit and manner in which it was laid down. The amount of gums, resins, and asphaltic material present in a paraffin is dependent upon the crude from which the wax precipitated; and the quantity of sand, silt, or water found in a deposit is due to the tendency of the

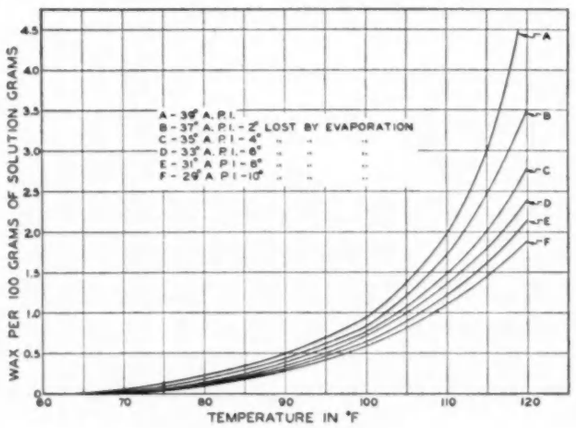

CURVE A - CRUDE WAX IN GASOLINE 81.0° A.P.I.
CURVE B - CRUDE WAX IN CRUDE OIL 39.0° A.P.I.
CURVE C - CRUDE WAX IN NUJOL 29.1° A.P.I.
WAX PER 100 GRAMS OF SOLUTION, GRAMS.
TEMPERATURE IN °F.
A
B
C

(After Reistle.)
**FIGURE 1**
**Effects of Temperature on Solubility of Crude Wax**

wax particles to adhere to any water, sand, or silt that might be suspended in the crude. When the wax is deposited, the sand, silt or water enclosed in the small wax grains also is laid down.

In order that a deposit of paraffin may accrue within an oil well or the pipe lines and tanks associated with the well, two phenomena must occur. First, the equilibrium of the oil-wax solution must be destroyed, for without this breakdown no wax could be precipitated. This condition of unbalance may take place at any point along the path which the oil travels in its movement from the pay formation to the tank battery. Second, the liberated wax grains must adhere, collect, or settle in such a manner that normal production practices will not remove nor dispel them. It follows, therefore, that if the small wax particles could be kept in suspension in the oil throughout the complete procedure of production and marketing, no paraffin problem would exist.

For practical purposes, the factors governing the solubility of crude wax in crude oil are temperature and evaporation of volatile constituents. Figures 1 and 2 [1] illustrate the effects of these factors on the solubility of crude wax. It readily can be seen that a drop in temperature reduces the solubility of paraffin in oil; and that a loss of those lighter ends, which are the better solvents for crude wax, decreases the


A - 39° A.P.I.
B - 37° A.P.I. - 2° LOST BY EVAPORATION
C - 35° A.P.I. - 4° " " "
D - 33° A.P.I. - 6° " " "
E - 31° A.P.I. - 8° " " "
F - 29° A.P.I. - 10° " " "
WAX PER 100 GRAMS OF SOLUTION GRAMS
TEMPERATURE IN °F
A
B
C
D
E
F

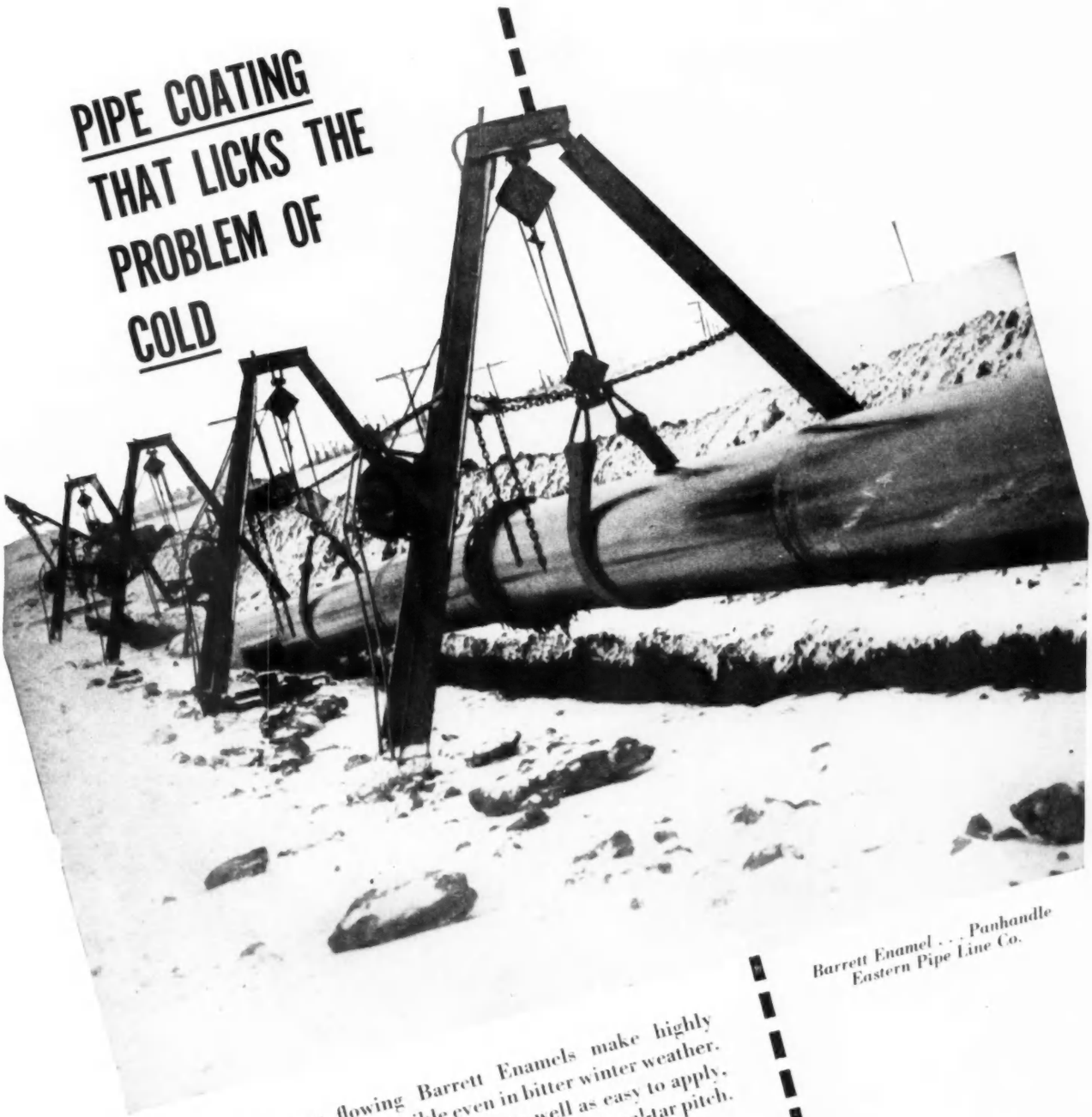
(After Reistle.)
**FIGURE 2**
**Effects of Evaporation and Loss of Volatile Constituents on Solubility of Crude Rod Wax in Crude Oil**

amount of paraffin that a given oil can carry in solution. Hence, if either individually or in combinations these factors reduce a wax-bearing oil to a supersaturated condition, it will precipitate paraffin in the form of very small wax crystals which, when in the presence of agitation, tend to agglomerate into small grains. These small grains will be carried in suspension in the oil until some surface, such as the sand face, pipe walls, or tank bottoms offer them a place to accumulate. Those conditions favoring accumulation are: 1, dead fluid spaces; 2, rough places in pipe, such as collar grooves; 3, cold spots, such as gas-lift foot valves; 4, alternate coating and draining of pipe surfaces, as is normal in surging wells; 5, oil produced as a mist, covering pipe with only a film of oil, as is experienced in high gas-oil-ratio wells; and, 6, movement of oil at slow rates approaching streamline flow, as is the case with strippers and prorated flowing wells.

Paraffin accumulations in producing oil fields may be resolved into five separate classes, which are: 1, paraffin in tubing of flowing wells; 2, paraffin in tubing of pumping wells; 3, paraffin in flow lines; 4, paraffin in stock tanks; and, 5, paraffin on sand face or perforated liners. This segregation or division is desirable because the methods employed to remove or prevent each type of deposition differ considerably. In order that the salient causes and effects of the deposit better may be brought out and that the techniques generally employed for handling the accumulation more easily may be analyzed, each of the five classifications will be considered separately. In doing this, emphasis will be given to those practices which were designated in the questionnaire response as being new or improved. The old methods remaining popular merely will be recognized.

The effects most commonly observed by opera-

# PIPE COATING THAT LICKS THE PROBLEM OF COLD



*Barrett Enamel . . . Panhandle Eastern Pipe Line Co.*

FLEXIBLE, easy flowing Barrett Enamels make highly efficient installations possible even in bitter winter weather. And Barrett Enamels are economical, as well as easy to apply, because of the use of an optimum percentage of coal-tar pitch. To a given coating thickness, Barrett Enamel goes farther. In service these Barrett products resist the rigors of extreme temperatures and the stresses of line currents and soil acids. Barrett manufacturing skill assures high uniform quality, and the expert assistance and inspection by Barrett-trained field men assure the right amount of the right kind of protection—when you specify Barrett.

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40 RECTOR STREET NEW YORK, N. Y.

**FIELD SERVICE**—To help engineers achieve the best possible results with the use of Barrett Enamels, we maintain a Pipe Line Service Department and staff of Field Service men. You can count on them for practical assistance on technical and in-the-field problems. Inquiries invited.

Barrett PIPELINE ENAMEL

tors, and usually attributed as direct results of paraffin accumulations in the tubing of flowing wells, are abnormal production declines, complete killing of wells and increased difficulty in running subsurface instruments and tools. In most instances the paraffin buildup in the tubing can be detected by an unnatural reduction in both flowing pressures and in producing rates at given choke settings. The factors

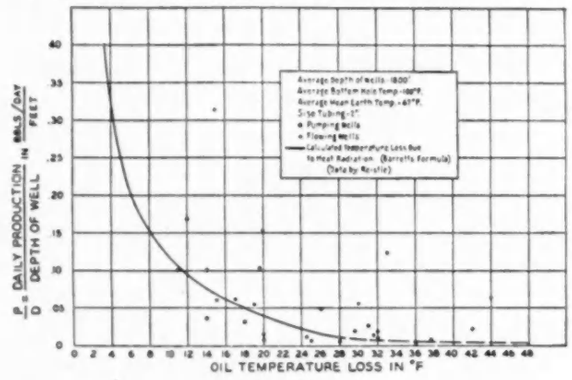



**FIGURE 3**
**Effect of Well Depth and Producing Rate on Temperature Loss from Formation to Surface—Wells at Salt Creek, Wyoming**

generally held responsible for the precipitation of the small paraffin crystals in the flow string of these wells are cooling of the produced fluid by expansion of the gas in lifting oil to the surface, cooling by radiation of heat from the fluid to the surrounding formation, and cooling by the evaporation of some of the lighter constituents in the oil. This evaporation of the lighter fluid ends results from pressure reduction, and lowers the solution temperature of the oil-wax mixture by allowing some of the better solvents for the wax to gasify.

The tendency of flowing wells to surge alternately coating the pipe with oil and the suspended wax grains, and then allowing the oil to drain away leaving the wax particles adhering to the pipe, is one of the prime reasons for paraffin accumulation. Wells that are flowed part time or intermittently also fall into this category—especially when the velocity of their fluid movement, while open, approaches that of streamline flow. It has been reported that wells in East Texas seem to have most severe accumulation at depths corresponding to the location of certain cool-water-bearing zones. In the same pool there is a tendency for paraffin to build up or localize at the static fluid level of the wells, particularly when this level fell opposite one of the many water-bearing zones. As wells declined and fluid levels fell below these water zones, the paraffin deposition was either reduced or eliminated. Wells producing at extremely high gas-oil ratios, such as 10,000 to 15,000 cubic feet per barrel, are usually victims of severe paraffin deposits in the tubing. This is due both to the tendency of the free gas to remove some of the lighter ends from the oil and to the mist or spray condition in which the fluid usually rises in the hole. The fine mist covers the tubing with a film of oil which is not thick enough to hold the wax particles in suspension; hence they adhere to the pipe walls.

The average oil producer today can do little to prevent paraffin accumulations in his flowing wells. Already aware of the benefits to be reaped by energy conservation, he has fitted his wells with the proper-sized tubing, has cased off zones bearing free gas and, by holding back pressure on his flow column, is making every effort to conserve the gravity of his crude. On the whole, conservation practices have reduced to a minimum many of the controllable factors causing paraffin deposition, but in so doing they have magnified the effect of another factor promoting wax accrual. That factor is production-rate restriction.

When wells are regulated to produce at low rates through flow beans or surface chokes, the paraffin problem is aggravated in two ways. Not only does the fluid radiate more heat to the formations surrounding the well bore, but also the moving fluid column loses part of its capacity for keeping the precipitated paraffin crystals or grains in suspension. Figure 3, prepared from reworked temperature data [1] on wells at Salt Creek, Wyoming, shows the effect of well depth and producing rate on the temperature loss of oil while either pumped or flowed from the formation to the surface. An average value for $K$ in Barrett's formula for temperature loss was arrived at, and the curve shown was calculated. It can be seen that, for a given bottom-hole and mean-earth temperature, an increase in producing rate or a decrease in well depth reduces the heat-radiation loss for both flowing and pumping wells. The variation in the pumping-well readings from the calculated curve is due to differences in the media surrounding both the tubing and the casing strings. The deviations of the flowing-well temperature losses from the calculated curve average above 17° F in a positive direction. This is due, no doubt, to the extra cooling promoted by the evaporation of volatile constituents and to the expansion of the gas in lifting the oil. In the tabulated data from which this figure was drawn, it was noted that the flowing wells having highest gas-oil ratio generally experienced the greatest loss. Every pool has its solution-temperature range; and, if the oil can be produced above that point, no paraffin will accrue within the wells. However, with the conservation practices that influence production in most states today, this is usually impractical.

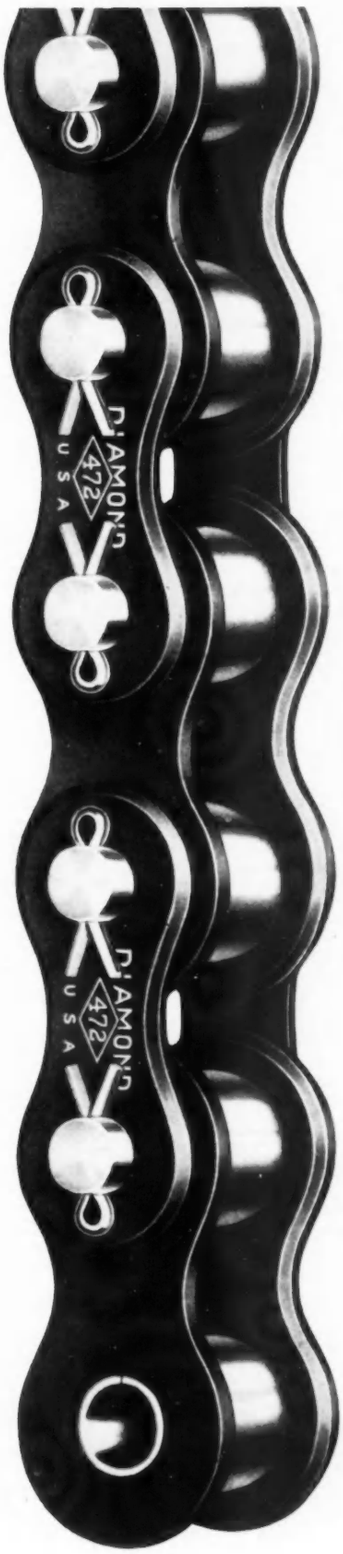
The approach to a solution of the paraffin problem in flowing wells must be made, therefore, from the angle of removing the mass after it has accrued. The Institute's questionnaire survey shows that there are four general methods now in use for removing paraffin from the tubing of naturally flowing wells. By breaking the replies down into their respective groups, it was found that 70 percent favored wire-line scraping tools, 11 percent employed automatic scrapers, 11 percent used stopcock flowing or purging to an advantage, and 8 percent employed either commercial or homemade solvents. The popularity of wire-line scraping is explainable, as it is the one method that universally can be applied successfully. The other techniques can be used only in instances when the local conditions are favorable.

### Wire-Line Scraping

Wire-line scraping has been a popular paraffin-removal method for a long time, but in recent years it has been modernized in the direction of low cost and rapid operation. Not only have the scraping tools themselves been improved, but also the hoists and lines with which they are run have been altered in favor of greater mobility and lower cost. The tendency, particularly when the number of wells to be scraped is large, has been towards light portable engine-operated units; or, in cases when wells have

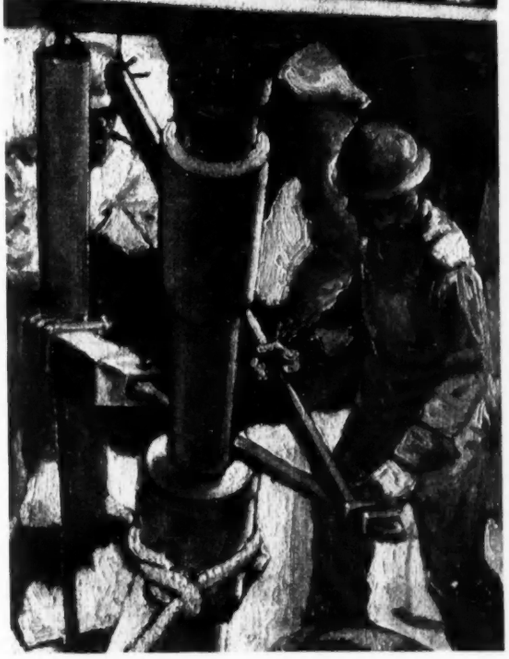
IT'S THE DRIVE YOU USE THAT MAKES THE DIFFERENCE

# THE PREFERRED POWER DRIVE



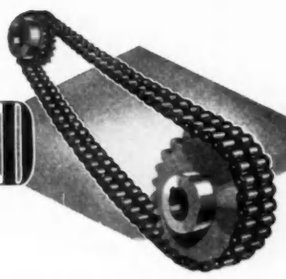

## Pioneer in the Oil Fields the World Over

Diamond Chain engineers have cooperated with oil field men and machinery makers for over 20 years. Long ago they pioneered in the "on-the-job" study of problems peculiar to the oil field, realizing that this important growing industry had problems not easily understood or solved at long range.



As advances were made—drilling pushed to greater depths, and power requirements for drilling, pumping and servicing multiplied—drives were needed that had the stamina and reserve strength to meet the changing conditions successfully.

DIAMOND Roller Chains have demonstrated through many years that they incorporate these necessary qualities,—can withstand shock and strains and long continuous hours of operation. Years of such proof coupled with the "on-the-job" experiences have made them the preferred drives of leading operators and machinery builders. DIAMOND CHAIN & MFG. CO., 485 Kentucky Ave., Indianapolis, Indiana. Tulsa office: 2238 Terwilleger Blvd.



DIAMOND ROLLER CHAINS

*50th Anniversary* *1890-1940*

IT'S THE DRIVE YOU USE THAT MAKES THE DIFFERENCE

been particularly troublesome with frequent scraping intervals, individual hand-operated installations have been made.

The mobile units of the new light type are mounted either on light trucks or lease cars, and usually consist of a wire-line reel connected with a small gaso-

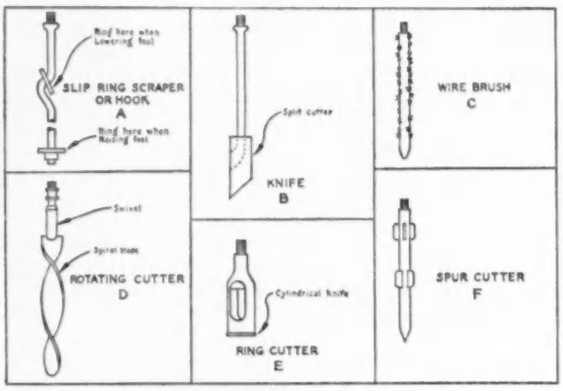



**FIGURE 4**
**Popular Wire-Line Scraping Tools Used to Remove Paraffin from Tubing**

line motor and fitted with a brake and idler; sufficient wire line to lower tools to desired point in tubing; a wire-line meter; a lubricator of sufficient length to accommodate tools; a conventional-type stuffing box fitted with swivel sheave, packing gland, and relief valves; and, proper-sized, wire-line socket, stem, jars, and cutter. Of course, the units operated by various companies differ considerably according to individual preferences. Instead of a separate motor for the reel, frequently power is provided by a direct drive from one of the car wheels or by one of numerous power-takeoff systems from the car's transmission. Some operators install automatic spudding devices on these light units, at considerable extra expense. However, it is the general consensus that paraffin cleanout work should be spudded manually; because the scraper progress can be determined more readily, and there is less danger of a wire line failing due to the snapping action, which is characteristic of the mechanical spudding movement. Many operators do not employ jars in their tool assemblies. This decision depends on the conditions at hand. The jars not only add weight to the tool assembly—which, in some cases, might cause the tools to cut the paraffin more rapidly than the fluid flow can carry it away—but also require the employment of a longer lubricator. On the other hand, the jars offer an advantage in breaking loose hard wax deposits and in removing stuck tools from the hole. For the most part oil producers employ, for paraffin work, the equipment already in their possession. Hence, heavy-duty all-purpose pulling units often are used. However, there is a definite trend among those purchasing new equipment toward these lighter models.

The hand-operated units employed on wells needing cleaning every few days seem to be gaining in popularity. They usually consist of a small reel mounted on the christmas tree, with a hand crank for raising the tools and a brake for lowering them. They are equipped with sufficient single-strand wire line to run the tools below the paraffin zone, permanent lubricator, stuffing box with sheave and packing gland, and proper cutting-tool assembly. Those operators using this method recommend that the tools be run fairly often; for, with no engine power available, only small loads can be pulled with the reel. The approximate cost of cheapest models of this type is $200, installed. This is compared with $600 to $800 investment required for the lowest-priced mobile units, not including the car or truck.

Some of the more popular wire-line scraping tools are presented in Figure 4. Type **A**, sometimes called a slip-ring swab, is a positive paraffin-removing tool. It is used mainly on jobs where wells have been killed by paraffin deposition. It does its intended work by actually pulling the paraffin from the hole under the power supplied by the reel. Those employing this tool advise that relatively small loads of paraffin be taken on each trip of the swab, as it is designed to come out of the hole with the ring in the horizontal position. Hence, overloading the reel capacity would result in a stuck tool. The other type of tools depends on the fluid flow of the well to bring the loosened wax particles to the surface. These tools facilitate faster cleaning jobs, but can be used only when the well is able to expel the cut deposits. The wire brush and spur cutter are not used as widely as the other types; because the former retards cleaning time because of difficulty in working it down the tubing, and the latter does not always give a clean job. Of the remaining three types, the ring cutter seems to

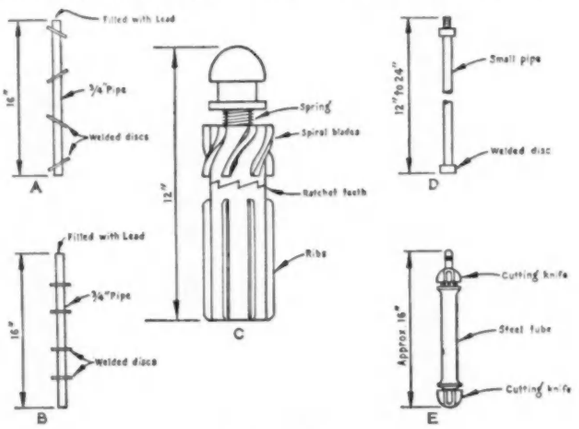
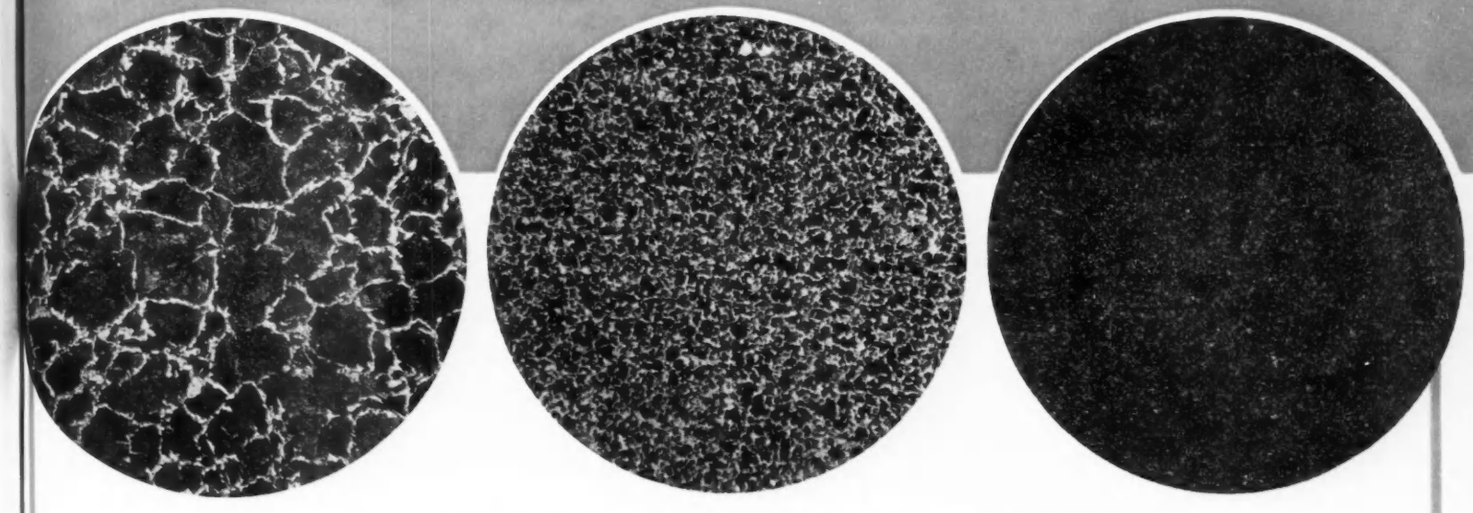



**FIGURE 5**
**Types of Automatic Scrapers Used to Remove Paraffin from Tubing of Flowing Wells**

have the widest range of popularity. It is more sturdy than the knife, and much less expensive than the rotating cutter. The rotating cutter, however, on many occasions has proved itself able to speed up cleaning jobs. In the Griffin pool of Indiana, for example, this type of cutter reduced paraffin cleaning time per well to less than 50 percent of that required when using a slip-ring scraper.

The selection and design of proper stem and jars should be given ample consideration. If wells need to be flowed fairly hard to bring paraffin to surface, a heavy stem should be chosen; and, if tools are apt to stick or paraffin requires considerable drilling, jars should be used in the tool assembly. A general preference for plunger jars over the older-style link jars is put down to the fact that plunger jars are less likely to foul in paraffin work, and that the same strength and jarring action can be designed into a smaller diameter in the plunger-type than in the link-type. The decision regarding the jars lies with the individual, and should be made according to the problem at hand. The elimination of jars and employment of a short heavy stem is reported to have expedited

# "Oilwell" Triple Heat-Treatment Assures Maximum Endurance of Sucker Rods



*Photomicrographs showing sucker-rod grain structure* (ENLARGED 100 DIAMETERS)

1. **AS FORGED** — large grain structure usually indicates loss of strength. The upsetting operation produces undesirable strains in the metal.

2. **NORMALIZED**—to reduce grain size and to relieve forging strains. Steel possesses greater toughness.

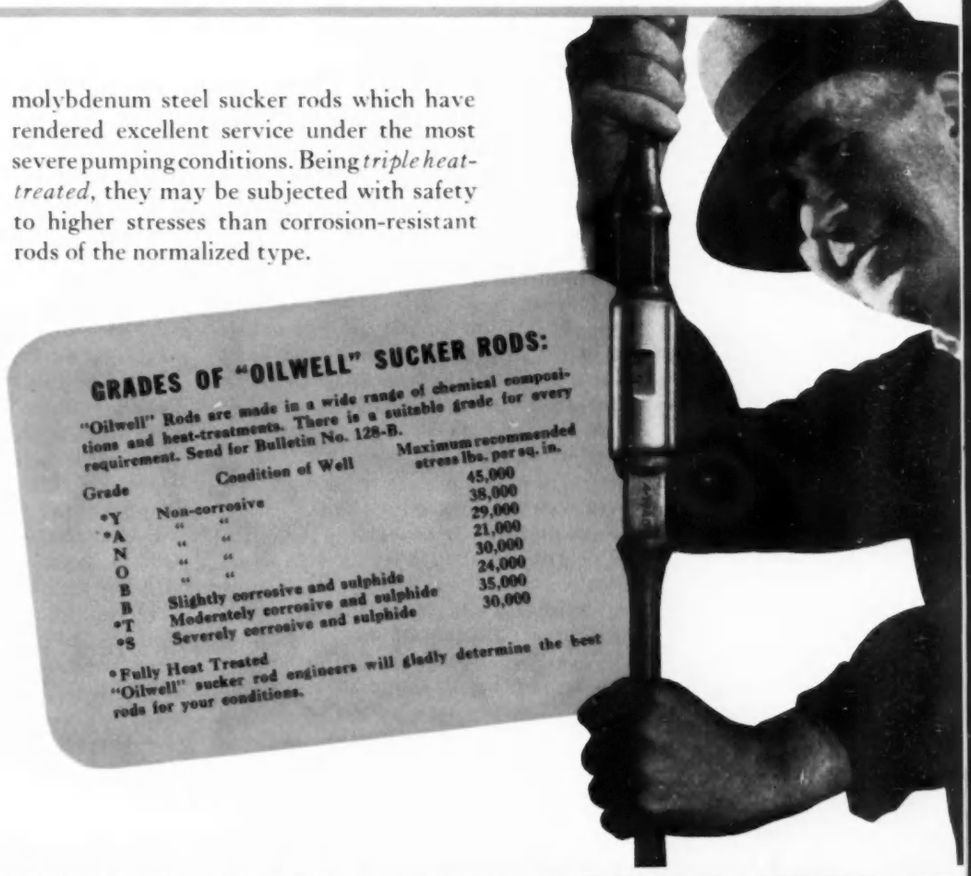
3. **TRIPLE HEAT-TREATED** — dense grain structure. Steel possesses its most desirable combination of strength, hardness, toughness and resistance to fatigue.

*FULL HEAT-TREATMENT* is the best-known method of increasing the endurance properties of sucker rods. With "Oilwell's" exclusive *triple heat-treating* process, the recommended maximum unit stresses for a given type of steel are substantially increased. This permits pumping deep wells and lifting heavy loads with a higher factor of safety. Rod failures are reduced and lifting costs are lowered.

"Oilwell" fully heat-treated sucker rods receive three separate heat treatments from end to end—normalizing to relieve forging strains; heating and quenching to obtain maximum strength, hardness and fine grain structure; drawing or tempering to impart toughness and resistance to fatigue.

If any one of these operations is omitted or applied only to the ends, the result is a weaker rod.

For sulphide and non-sulphide corrosive wells, "Oilwell" has developed special nickel-molybdenum steel sucker rods which have rendered excellent service under the most severe pumping conditions. Being *triple heat-treated*, they may be subjected with safety to higher stresses than corrosion-resistant rods of the normalized type.



## GRADES OF "OILWELL" SUCKER RODS:

"Oilwell" Rods are made in a wide range of chemical compositions and heat-treatments. There is a suitable grade for every requirement. Send for Bulletin No. 128-B.

| Grade | Condition of Well | Maximum recommended stress lbs. per sq. in. |
|---|---|---|
| •Y | Non-corrosive | 45,000 |
| •A | " " | 38,000 |
| N | " " | 29,000 |
| O | " " | 21,000 |
| B | " " | 30,000 |
| B | Slightly corrosive and sulphide | 24,000 |
| •T | Moderately corrosive and sulphide | 35,000 |
| •S | Severely corrosive and sulphide | 30,000 |

•Fully Heat Treated

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low paraffin cleaning costs by allowing the use of a lubricator sufficiently small to do away with tubing-board installations.

### Automatic Scrapers

A relatively new tool for removing paraffin from tubing of flowing wells is the automatic scraper. This scraper or dart varies in weight from 1 to 5 pounds, and is of a diameter slightly less than that of the tubing into which it is run. Figure 5 illustrates various types of automatic scrapers now used in some of the Texas, Louisiana, and New Mexico fields. These "go-devils" are placed in the well by means of a lubricator, and allowed to fall to the bottom of the

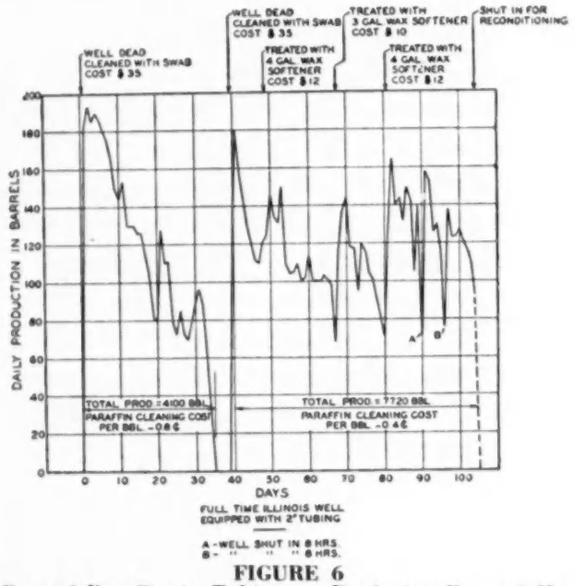
WELL DEAD CLEANED WITH SWAB COST $ 35
TREATED WITH 4 GAL WAX SOFTENER COST $ 12
WELL DEAD CLEANED WITH SWAB COST $ 35
TREATED WITH 3 GAL WAX SOFTENER COST $ 10
TREATED WITH 4 GAL WAX SOFTENER COST $ 12
SHUT IN FOR RECONDITIONING
DAILY PRODUCTION IN BARRELS
TOTAL PROD = 4100 BBL
PARAFFIN CLEANING COST PER BBL = 0.8 ¢
TOTAL PROD = 7720 BBL
PARAFFIN CLEANING COST PER BBL = 0.4 ¢
DAYS
FULL TIME ILLINOIS WELL EQUIPPED WITH 2" TUBING
A - WELL SHUT IN 8 HRS.
B - " " 6 HRS.

**FIGURE 6**
**Effect of Paraffin in Tubing on Producing Rate of Head-Flowing Well, and Comparison of Several Methods of Removing the Accumulation**

tubing or to a stop or pinned collar placed just below the normal paraffin zone. When the well is opened, the scraper is propelled to the top of the hole; it enters the lubricator, and remains there until the well is shut in—at which time it returns to the tubing stop. A wood block, coil spring, or rubber bumper usually is supplied in the top of the lubricator to ease the shock of the "go-devil" when it is flowed to the surface. Either a gate or a spring latch permits retention of the scraper on the surface for inspection or repairs. Types **A, B,** and **D** in the sketch are homemade, and involve little investment. Types **C** and **E** are commercially-manufactured "go-devils," which are better scrapers in themselves and, hence, cost more money. As a method of removing paraffin, automatic scraping is very satisfactory if the local conditions are favorable. In areas where deposition is extremely rapid, where wells have low flowing pressures, and where well conditions are changing rapidly, it is usually not advisable to attempt this solution. In fields where automatic scrapers are used, it has been found advisable, according to the consensus of questionnaire replies, to run the scrapers at least once per day. This prevents the building of a deposit of such size as to stick the scraper. The cost of installing a commercially-manufactured automatic-scraper system, complete with removable tubing stop, lubricator, and shock absorber, varies from $275 to $350 per well. Several companies, however, report that by making their own scrapers, stops, lubricators, and shock absorbers, investments of less than $100 per well have been required.

Chemical treatment of flowing-well tubing strings for paraffin removal with either solvents or softeners has been successful, and is economical in some instances. Those operators not having a sufficient number of wells or a high enough "plugup" frequency to afford scraper units often can use certain homemade or commercial chemicals to advantage. The Institute's survey indicates, however, that operators generally have been disappointed with their attempts at chemical cleanouts, and that many of those who found them successful have turned to wire-line scraping for the sake of economy. In areas where wax accumulations in tubing are exceedingly dry and hard, chemical has been used to some advantage in association with scraping operations. The solvent, when lubricated into the well and allowed to react with the deposit prior to a scraping job, often enables the deposit to be removed with greater speed. For operations of this type the cheaper crude-oil derivatives are recommended, because a sufficient quantity can be afforded economically to enable the greater portion of the deposit to be contacted. The net opinion of the survey is that the employment of commercial chemicals to prevent paraffin deposition in the tubing of flowing wells is not practical, and that its use for removing such deposits is usually not as satisfactory nor economical as scraping. It is agreed, however, that there are certain instances when chemical removal can be applied. Figure 6 shows the production statistics for a head-flowing well in Illinois whose 300 feet of paraffin zone were cleaned both mechanically and chemically several times. The high cost of the swabbing jobs was attributed to the fact that a regular heavy pulling unit was used because no light scraping rigs were available in the field. The chemical employed was a commercially-manufactured softener which was diluted with water to give more treating surface. In this instance the chemical kept the well producing at just half the cost of that of the wire-line scraping method.

In many fields the paraffin problem encountered in the tubing of gas-lift wells is more aggravating than that of flowing wells. This is attributed to the tendency of the dry input gas to accentuate that loss of volatile constituents normal to natural flow. Several methods were reported as successful in the handling of this problem. On wells in the Anahuac field of Texas, having 1-inch tubing and 1-inch acme gas-lift valves inside 2-inch tubing, paraffin is removed from the 1-inch satisfactorily by circulating hot water down the 1-inch and up the annular space in the 2-inch tubing. At Santa Fe Springs, California, it is reported that periodic heating of the circulating gas with a heat exchanger is successful in removing paraffin from the flow strings of gas-lift wells. In many of the Wilcox sand pools of Oklahoma, high-gravity solvents, usually 26-pound-vapor-pressure gasoline-plant products, are employed with good results for dispelling wax accumulations from the flow strings of gas-lift wells. Successful treatments of this type are secured when high-solvent batching ratios are used, and when wells are flowed to the top several times following the solvent introduction to permit sufficient solvent-wax reaction to occur. In the Rincon pool of California the paraffin problem was reduced and, in some cases, completely eliminated in the tubing of gas-lift wells by shutting down the gas-absorption plant. An increase in oil gravity

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of more than 2° API following the circulation of wet gas apparently gave the oil enough added solvent power to hold the wax in solution during its movement from the sand face to the surface.

### Paraffin in Tubing of Pumping Wells

Paraffin deposits in the tubing strings of wells produced by sucker-rod pump usually result in increased wear on pumping equipment, increased power consumption, added difficulty in pulling rods, and failure of rods to fall. In some instances the accumulations become severe enough to cause production declines, rod failures, and split tubing. The factors encouraging wax precipitation are radiation of heat to the formations adjacent to the well bore, and evaporation of some of the volatile constituents. Wells in the young pumping or agitating stage experience additional cooling by the gas doing work when the well flows by heads. In old settled pumping wells the main factor is heat radiation; the smaller the well, the greater the temperature loss (see Figure 3). In some cases stripper wells are affected by atmospheric-temperature changes in the topmost tubing joints. Generally, the paraffin problem in wells lifted by sucker-rod pumps is most severe in the early stage, as gas depletion and water encroachment tend to reduce heat losses in later life. Even in its worst form, the deposition is less aggravating during pumping life than in the flowing or gas-lifting period. Wells whose paraffin accumulations are severe during the flowing stage often present no difficulty throughout the pumping life. Even though the wax crystals are suspended in the oil, sufficient agitation often is set up by the rod-string movement to prevent their adherence to the pipe walls. Wells with faulty pumping valves frequently suffer undue deposition in that, when they are shut down, the fluid drains from the tubing to leave paraffin particles on the pipe walls. This is similar to the alternate wetting and drying of tubing experienced in head-flowing wells and agitating pumpers.

As is the case in flowing wells, very little has been accomplished in the last 10 years toward preventing paraffin accumulations in pumping wells. Gas anchors, rod scrapers, back-pressure valves, and preventive chemical treatment have met with random success in various localities. Down-the-hole electric heaters are on the market, which seem to be successful in keeping small fluid quantities above their solution temperatures; however, the initial investment, to say nothing of operating power costs, is usually greater than that of conventional removal methods. Back-pressure valves employed to hold pressure on the fluid column of agitating pumping wells have been partly successful in reducing paraffin accumulations, and generally promote a softening of the wax masses that do accrue. However, that stage of a well's life is ordinarily too brief to warrant the installation of the valves. Chemical prevention is equally unpopular, as the cost is prohibitive. The consensus expressed in the questionnaire survey is that it is usually cheaper to remove the deposit than to prevent it chemically.

Analysis of those methods of removal favored by the individuals and companies responding to the questionnaire survey show that the following are used for handling paraffin in the tubing of pumping wells: 33 percent remove paraffin by pulling rods only; 25 percent use chemical solvents or softeners, either alone or in association with rod pulling; 19 percent pull tubing, and use steam on the individual joints; 14 percent run scrapers or swabs after the rods have been pulled; and 3 percent favor miscellaneous methods such as rod scrapers, circulation of hot water, and holding back pressure. As all of these methods are familiar ones, with obvious theories behind them, little need be said in the way of description. The chemical treatment, however, being relatively new in its present popularity, should be reviewed.

### Chemical Treatment for Removal

Chemical treatment for removal of paraffin from rods and tubing of pumping wells has gained in popularity mainly as a result of the energies of various manufacturing chemical companies. Many of the pumping fields of Michigan, Indiana, and California report chemical batching to be a regular technique for ridding tubing of wax accumulations. The survey indicates this method to be particularly popular for use in wells where the paraffin accumulates very rapidly, or where the deposit is of such severity that rods are difficult to remove for pump-part changes.

The techniques usually employed are to batch-treat either in the tubing itself or in the casing, with subsequent circulation of the chemical past the deposit. Continuous feeding down the annular space is not recommended, as the amounts necessary for successful removal are excessive. The usual practice is to pour a predetermined quantity of the selected solvent or softener into the tubing. Care should be taken to dilute the batch so that its gross density will be only a little heavier than that of the oil through which it is to settle. This is necessary, as a mixture which is too heavy will settle past the wax mass without sufficient reacting time, and one that is too light will fail to settle at all. After the well has been shut in long enough to allow the treating compound to work its way to the bottom of the paraffin zone, the loosened wax may be pumped out or the rods pulled. Wells in the stripper stage handling small quantities of fluid should be pulled, following such treatment; for the loosened wax, being heavier than the oil, will fall from suspension when the velocity of the moving oil-wax column is low. The number of treating techniques very nearly equals the number of commercial chemicals on the market, each organization employing a scheme of its own. Any that provide sufficient chemical contact with wax are satisfactory.

There have been numerous failures reported with commercial chemicals of the various types. This is explained by the fact that the accumulated waxes differ widely from field to field—being hard and dry in one well, and soft and mushy in another. As the amount of solvent or softener that can economically be used per treatment is based on the unit cost of the chemical and the expense of the mechanical methods previously employed, it can be seen why universally successful applications of the chemical method cannot be achieved. Generally, selection of chemical is made on the basis of the service associated with it, and not on the solvent or softening action of the compound itself. Usually price differentials are adjusted to make up for the strength variation in the commercially-sold chemicals. Operators are cautioned against chemical salesmen whose ambition prompts them to claim that small amounts of their compound not only will clean tubing and rods, but will put all the removed wax into true solution with the produced oil. There is no compound on the market that has this power. The most successful cleaning solvents

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*...the same precision gauges, registering .0001" measurements, are used to insure absolute uniformity in dimensions.*

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or softeners, when used in amounts that the operator can afford, put only a small portion of the removed paraffin into solution. Unless the well is pumped into a pit until the suspended wax is exhausted, tank bottoms always accrue after cleaning work.

### Paraffin in Flow Lines

Paraffin in the flow lines commonly is accompanied by unnatural production-rate declines in both flowing and pumping wells. Other effects observed on pumping wells are stuffing-box failures, extra power con-

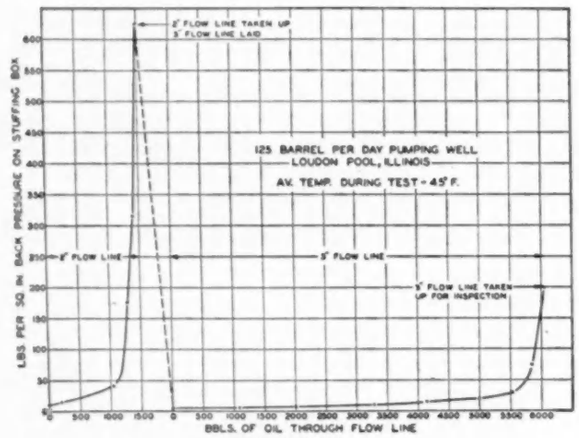
2" FLOW LINE TAKEN UP
3" FLOW LINE LAID
125 BARREL PER DAY PUMPING WELL
LOUDON POOL, ILLINOIS
AV. TEMP. DURING TEST - 45° F.
2" FLOW LINE
3" FLOW LINE
3" FLOW LINE TAKEN UP FOR INSPECTION
LBS. PER SQ. IN. BACK PRESSURE ON STUFFING BOX
BBLS. OF OIL THROUGH FLOW LINE

**FIGURE 7**
**Effects of Increasing Flow-Line Size on Rate of Back-Pressure Buildup**

sumption, and increased wear on pumping equipment. The accumulation primarily is promoted by low atmospheric temperatures, and is usually most severe in the pumping and small flowing wells of the northern producing fields. However, the flow lines of wells that pump or flow by heads in the more moderate climates are often subject to the accumulation. This is almost always due to the alternate wetting and drying of the pipe walls and to the additional cooling brought about by the intermittent gas and oil heads. Such factors as length of line, size of line, and presence of numerous fittings or dead fluid spaces often aggravate the accumulation of the suspended wax.

The methods customarily chosen for preventing harmful wax deposits in flow lines are the use of low-pressure flow-line heaters near the well heads, setting of back-pressure valves on flow lines near tank batteries, altering of flow-line size, production of several wells through a common line, and burying or covering of lines. Low-cost horizontal- or vertical-type heaters fired by casing-head gas have reduced lead-line cleanouts from two to three times per month to once per winter in one of the new Illinois pools. One Illinois company recently reduced its lead-line cleaning costs on 22 wells from $0.91 per well day to $0.12 per well-day, by installing these gas-fired oil heaters. As the heaters cost $85 per well, installed, an investment return is expected after 3½ months of winter operation. In the Conroe field of Texas the application of 150-pound back pressure on the flow lines of flowing wells completely eliminated wax accumulation. At Oklahoma City it was possible for one operator completely to eliminate flow-line deposits on several leases by decreasing the flow-line size from 8¾- to 4-inch pipe. The increased fluid velocity afforded by the reduced cross-sectional area gave the moving oil sufficient scouring action to keep paraffin from building up. Data recorded on a pumping well in the Louden pool of Illinois showed that the cleaning interval for a 3-inch line was 4 times that of a 2-inch line (see Figure 7). This decreased cleaning frequency was explainable by the additional space offered in which the wax might accrue before requiring a line cleanout, and not by any decrease in the tendency of the paraffin to deposit. The pumping of several wells through the same flow line and burying the lines have proved effective in the older stripper fields of Pennsylvania and New York, especially when considerable quantities of water are handled.

The practices most popularly employed for removing the wax deposits from flow lines are burning crude oil in bell holes under the line while the well is producing; steaming the lines with a centrally-located boiler; purging the lines by opening the chokes on flowing wells; circulating either hot water, kerosine, or gasoline through the lines; and "breaking out" lines and firing each joint. The methods best fitted for application in the northern fields, where winter temperatures are severe, are those embodying heat. Referring again to Figure 1, gasolines and kerosines lose most of their solvent power for wax at low temperatures. Purging the lines by employing high producing rates is successful in flowing fields, provided the wax deposit is not too hard and that the purging is done at frequent intervals. For the most part, little progress has been made in the last 10 years toward either preventing or removing paraffin from flow lines. The old methods still seem to be the most practical. In the newer fields firing the line with crude oil is taking the place of the old lease-boiler method. This decline in the use of steam is explained by the elimination of steam power as a popular pumping method. The installation of lease boilers as a means of attacking paraffin problems alone is not a common practice, as the expense of the boiler and steam lines does not compare economically with other methods. Chemical-solvent manufacturers generally do not recommend solvent for flow-line cleaning because of the difficulty in reaching all portions of the deposit with a quantity sufficiently small to compete with other methods on a cost basis.

### Paraffin in Stock Tanks

Paraffin tank bottoms result not only from the settling of those suspended wax particles which might have been liberated in the tubing and flow lines, but also from the precipitating and subsequent settling of new wax as the oil cools in the tank. The wax grains, being more dense than the oil, settle to the bottom of the vessel as soon as the fluid becomes quiet. The presence of small quantities of water, sand, or silt accelerates the wax-settling action, because these foreign substances act as nuclei around which the wax grains gather. The only practical means of preventing paraffin tank bottoms is to heat the oil above its solution temperature and hold it there until the crude is sold. Gas-tight storage tanks, however, have assisted to some degree in reducing the accumulation, by preventing further evaporation of volatile ends. In most localities producers have found it uneconomical to heat crude oil for the sole purpose of preventing paraffin bottoms, as the gravity and volume losses normal to heating operations usually more than balance the saving in paraffin losses and cleaning costs. In one Illinois pool, field tests were run to determine the volume losses promoted by crude-oil heating practices. Results of that test work are shown in Figure 8. By incorporating this information with

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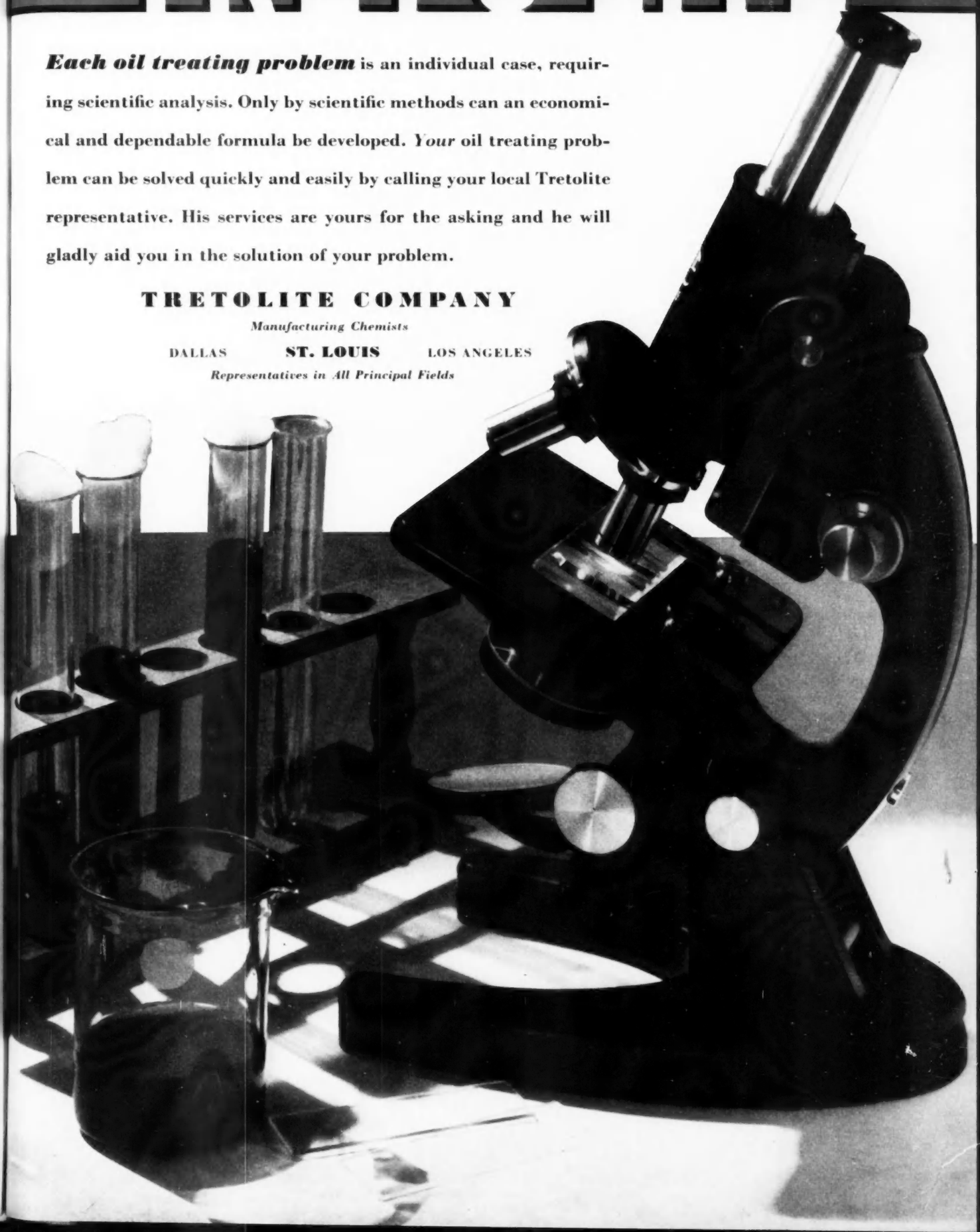

that concerning the cost of cleaning and disposing of tank bottoms, the value of disposed fluid, and the temperature necessary for the prevention of paraffin bottoms during winter months, it was possible to calculate the advisability of heater installations on each of the leases in this pool. Only on a few large-capacity producing properties was it found economical to install heating equipment for paraffin tank-bottom prevention. If oil were sold in this area on a gravity basis, even those few leases would not have warranted the heater installations.

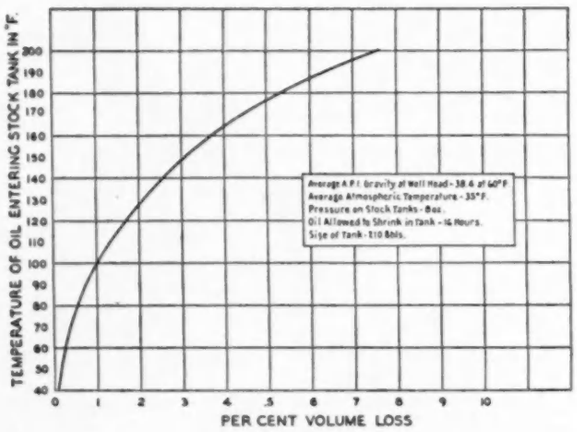
TEMPERATURE OF OIL ENTERING STOCK TANK IN °F.
PER CENT VOLUME LOSS
Average A.P.I. Gravity at Well Head - 38.6 at 60°F.
Average Atmospheric Temperature - 35°F.
Pressure on Stock Tanks - 8oz.
Oil Allowed to Shrink in Tank - 16 Hours.
Size of Tank - 110 Bbls.

**FIGURE 8**

**Effect of Heating Oil on Volume Shrinkage Resulting from Evaporation of Volatile Constituents, Illinois Crude, Chester Sands**

Replies to the survey questionnaire show that 80 percent of those operators experiencing paraffin tank bottoms do not find it economical to recover the waxy ends for pipe-line sale. The low price of crude oil and the high cost of labor and equipment do not make it feasible for producers to equip leases with reclaiming plants. The 20 percent reporting tank-bottom salvage as an economical procedure already are using heat for emulsion treating. Hence, they can afford to render their tank bottoms salable by mixing the wax with fresh crude in the presence of heat. It is interesting to note that chemical solvents are unnecessary for this type of reclaiming work. The most generally followed method of disposing of paraffin tank bottoms is the use of the fluid as lease road-surfacing material. However, a number of operators report burning the wax in lease or field burn pits.

### Paraffin on Sand Face or Perforated Liners

This class of accumulation is usually very difficult to detect; for the production decline by which it is characterized often is mistaken for the normal behavior of a well. The problem is most serious in old wells where marked reductions in reservoir pressure have allowed the evaporation of the lighter ends of the oil. If the evaporation has been of sufficient degree to raise the solution temperature of the crude above that at which it enters the well bore, wax will be liberated. The use of vacuum pumps is a method which hastens that condition. In some wells the cooling brought about by the expansion of gas through the pores of the sand is thought to aggravate wax precipitation. However, in most cases this factor is practically negligible, when it is considered that in young wells the hydrostatic head on the sand face tends to prevent any appreciable cooling, and that in old wells the quantity of gas is seldom large enough to alter the normal bottom-hole temperature by any measurable amount. After the wax has been liberated, it either is pumped from the well or is deposited on the sand face or the perforated liner sections which are used in certain types of completions. One of the main factors promoting the accumulation is that of allowing the fluid level to be pumped below the top of the perforations or below the sand face. This encourages accumulation; because the fluid flows through the sand and down the face in a thin stream which, not being of sufficient size nor velocity, will deposit wax crystals rather than carry them in suspension. The same reasoning applies to the perforated sections. It is predicted that wells being completed in several pay zones, as is now a popular practice, will suffer from this accumulation during their stripper stage.

The paraffin questionnaire survey shows that methods now being used by operators to remove paraffin deposit in the old fields include batch treatments of hot water, steam, gasoline; heat generators; and commercial solvents or softeners. As past records on old wells are incomplete, it is difficult to determine which of the various materials produce the best results. Hot water, steam, gasoline, and solvents are employed mainly in the Eastern stripper fields; whereas heat generators and penetrating softeners are at present quite popular on the West Coast. Sizable production increases are reported to have followed paraffin removal from perforated liner sections in the Sunset pool of California when heat-generating caustic treatments have been used in accompaniment with a down-swabbing of the perforated zones. One producer in the Venice (California) pool reports that the employment of a solution of water and a commercially-sold penetrating softener has permitted him to produce wells that long since would have necessitated abandonment. In the Lima field of Ohio the limestone pay is treated for paraffin removal with 100-barrel batches of hot water. The resulting production increases indicate success. Commendable progress has been made along the lines of chemical treatment, particularly in California. It is thought that paraffin deposit offers the commercial chemicals the greatest opportunity for success, and that future years will find them being employed on the greater portion of paraffin cleaning work throughout the industry.

### Acknowledgment

The author's appreciation is expressed to The Carter Oil Company for permission to prepare and present this paper, to members of the Institute's Topical Committee on Production Practice in all districts through whose efforts the questionnaire was distributed, and to all persons supplying information through the questionnaire or by way of special correspondence.

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In addition, the following references have been of especial value in correlating new or personal information with past experience, and in consolidating the great variety of material gathered on the subject of paraffin problems:

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W. N. Little, "Paraffin Problems in the East Texas Field" before API Division of Production East Texas Chapter, Feb. (1940).

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J. M. MacQuarrie, "Paraffin Problems Found in East Texas Oil Field and Methods of Prevention and Treatment," *Oil Gas J.* **31** [25] 14 (1932).

G. F. Williams and F. N. Alquist, "Chemical Removal of Paraffin from Pumping Wells," *Oil Weekly* **96** [6] 22 (1940).

Brad Mills, "Paraffin Formation and Removal by Mechanical Methods in Pumping Wells," *Oil Weekly* **96** [5] 14 (1940).

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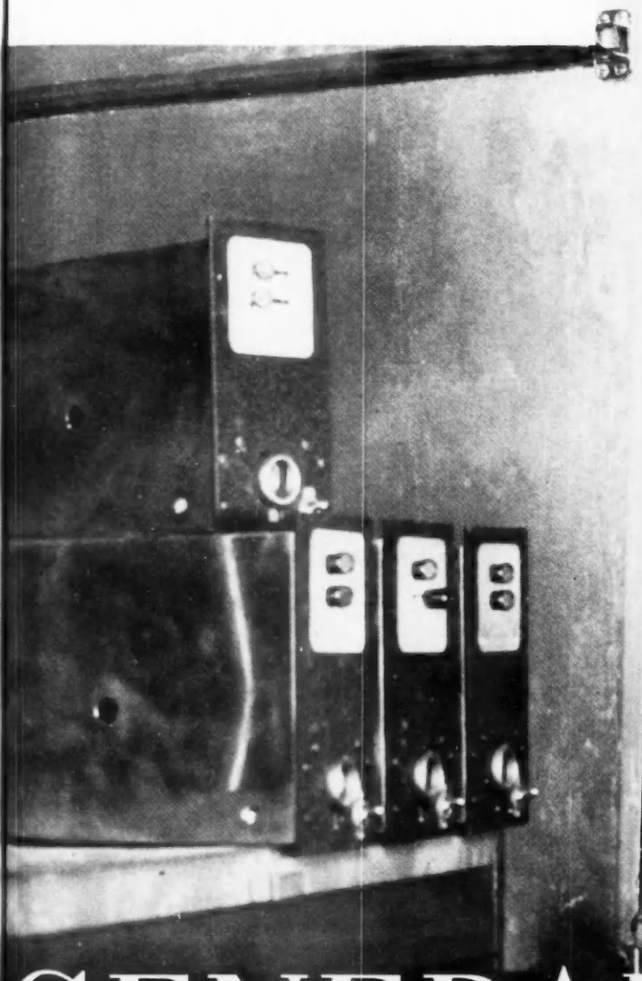

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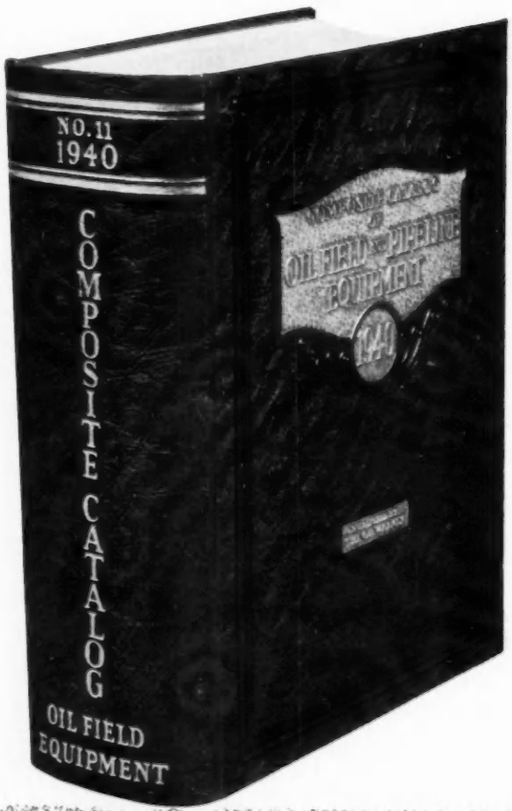


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# DRILLING CONTRACTORS' NOTEBOOK

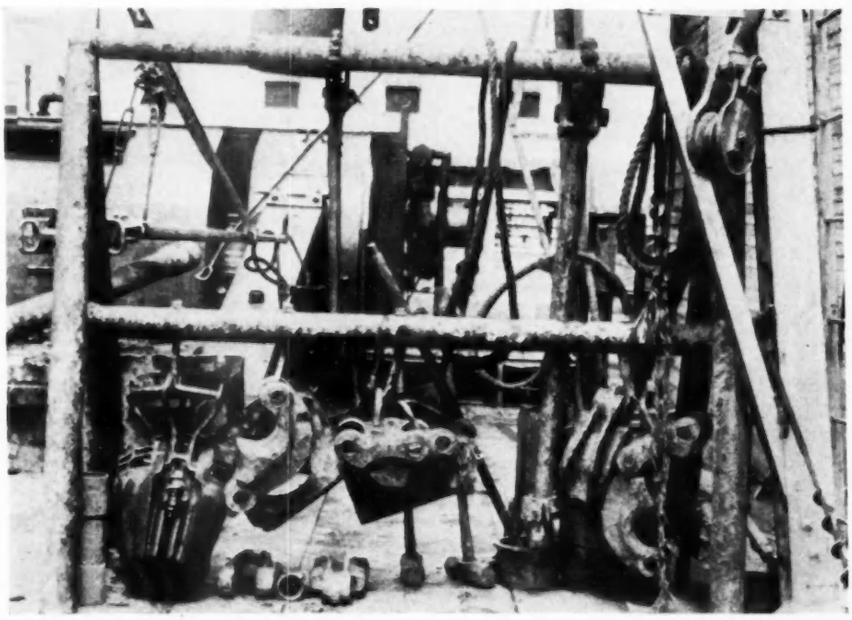
***Helpful Suggestions For Those Interested In Drilling Methods***

***Operating Ideas Maintenance Hints New Rig Hook-ups***

**Published as a regular feature of THE OIL WEEKLY**

## 1. TOOL CARE

### Movable Rack Placed on Derrick Floor Has Hooks for Assorted Tools



**This pipe rack with fixed hooks on the lower cross-member affords storage for idle tools and permits a quick check-up of items for instant use when needed.**

TOOLS left lying around the derrick floor, or stacked haphazard in a corner, constitute an accident hazard and delay work while the desired unit is hunted up and brought to the job.

One driller builds a heavy rack of pipe, with the upper cross piece serving as storage for chain tongs, wrenches and extra slings. The braces between the lower members of the A-frame ends are fitted with paired hooks, welded to or bolted through the brace, serving to store slips, spare wrench jaws, break-out plates and other smaller parts. When so placed, selection of the desired tool is instant, and it may be removed without disturbing or moving any of the others.

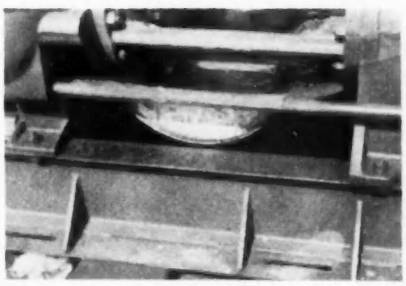
When shifting location, the rack and its contents may be lifted as a unit onto a truck, transported without time lost storing tools and accessories.

## 2. PUMP CARE

### Split Oil Barrel Catches Leakage

AN oil barrel may be split and a portion of the sides turned out as a flare skirt and supported beneath the packing glands of mud pumps to catch leakage and water used to wash the pump end of the piston rods.

The small bung hole in the head of the drum is used to attach a convenient length of pipe to lead the water away from the pump to a drain so pump setting will not become soaked and muddy. A lightweight barrel is easily cut to fit the pump.

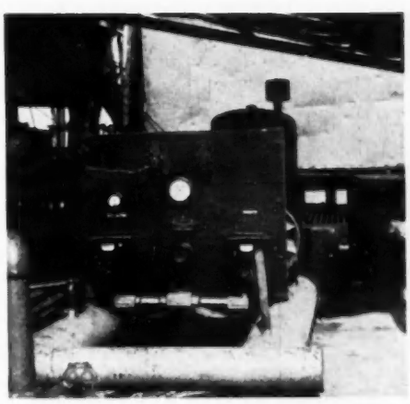


**Half an oil drum, split and flared, may be placed beneath piston rods of the mud pump to drain leakage.**

## 3. POWER

### Controls Adjacent to Generating Unit

AN electric control panel is mounted along with the generating unit on a pipe skid base for convenience and simplified maintenance on a rig of Warren & Bradshaw Drilling Company in



**This electric control panel is mounted on a pipe skid base along with the generating unit to aid in handling.**

the Coyle pool, Payne County, Oklahoma.

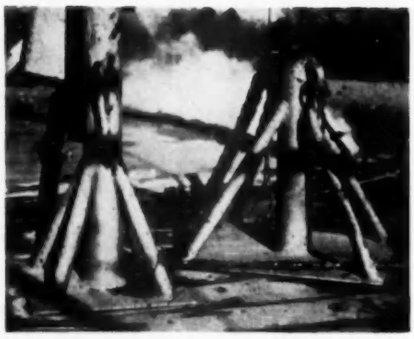
A tin shed is mounted over the unit to afford protection against the weather. Six- and 10-inch pipe is used for the base.

### 4. SAFETY

## Cathead Trigger Trips Master Clutch

TO safeguard the men on the derrick floor who use the cathead, Rowe Brothers, drilling contractors in the Hull-Silk area of West Texas, are using a safety latch, or trigger, which trips out the master clutch if any object too large attempts to pass between the cathead and the trigger. The trigger has a quick-acting latch connected by linkage to the master clutch pedal which may be adjusted for small or large rope. If the ordinary size spinning line or derrick cable is used, the latch is adjusted for that clearance. If a smaller, or larger line is used, the adjustment can be made to compensate for the difference by using one clamp bolt. In the picture, the spinning line was intentionally fouled by running one loop over the others, which immediately stopped all movement of the cathead shaft by disengaging the master clutch, the moment the fouled loop passed between the trigger and the cathead.

**A trigger extending over the cathead throws out the master clutch when an object too large attempts to pass by it.**



**These broad flat bases, adequately braced, support standpipe and break-out post, distributing load over a wide floor area while permitting lateral shift without strain on fixtures.**

### 5. STAND PIPE

## Broad Base Permits Moderate Shifting

IF rigidly mounted on derrick floor, the stand pipe must stand severe whipping or vibrational stresses as the derrick vibrates under drilling, reaming or hoisting loads. One drilling contractor provides a floating mounting for both stand pipe and break-out tong post by carrying them on broad, flat footings, angle-braced to upright section by four welded supports.

These footings are not fastened to the derrick floor, but are wide enough to span two or more floor boards, and thus can shift slightly under load to afford more direct alignment with the load they are called upon to carry.

In the case of the stand-pipe base, the upright section is a part of the mud line, being provided with welded-in side outlet for incoming mud line, and carrying the stand pipe itself made up in the threaded upper end.

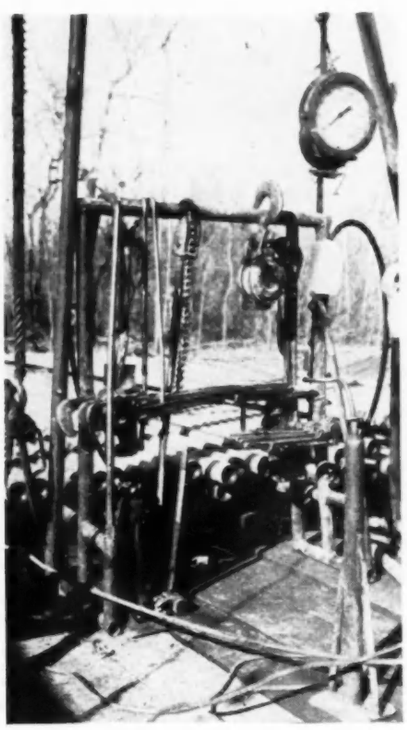
The break-out post is attached to derrick substructure by a short length of heavy drilling chain, linked through an eye directly in line with the one carrying the tong line.

### 6. TOOL CARE

## Rack for Small Rig Tools

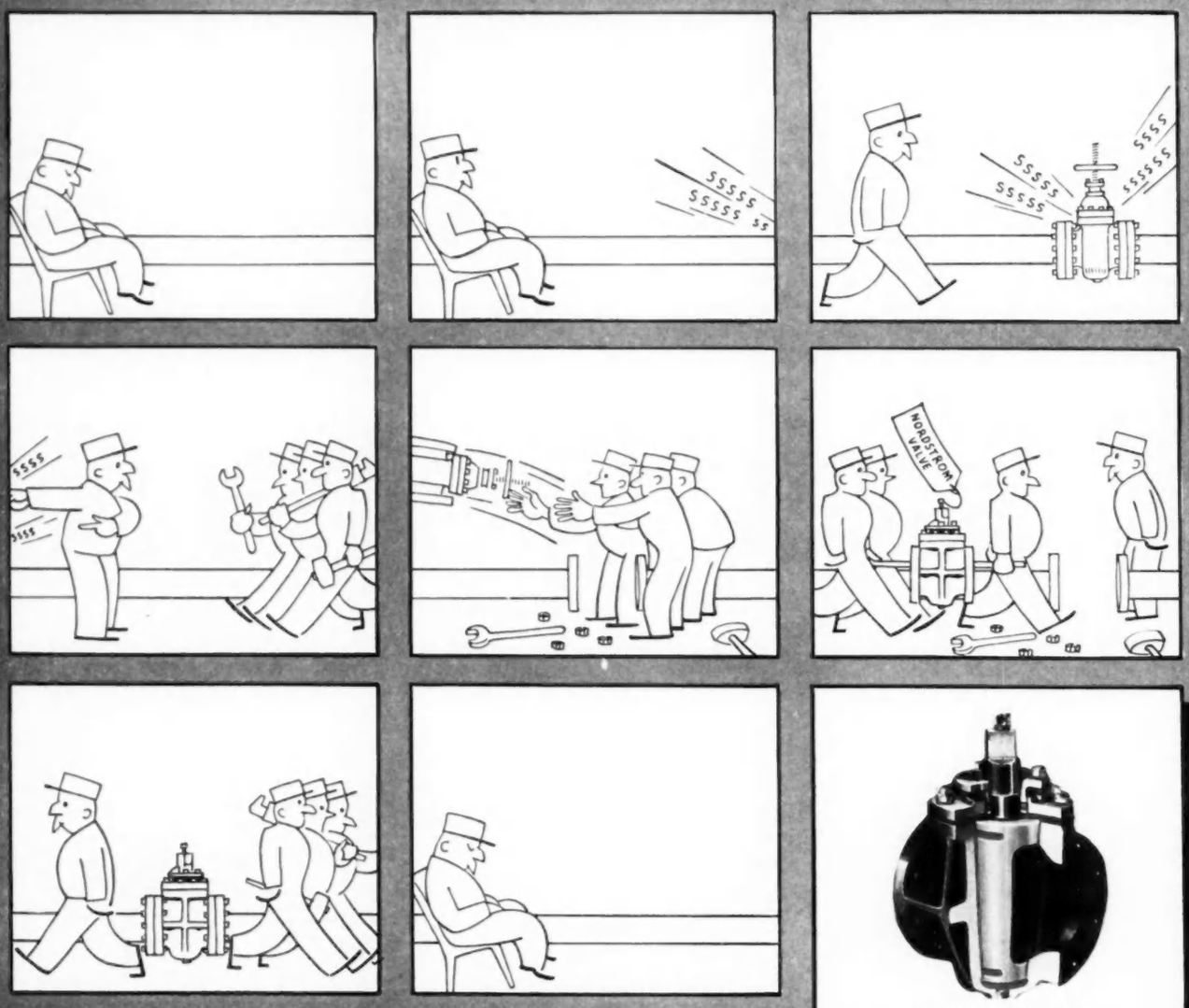
WILCOX Oil and Gas Company has devised a means of keeping an orderly arrangement of small tools on the rig. This handy tool rack, now in service in the Sac and Fox pool, Oklahoma, serves a definite purpose for the drilling crew.

The rack, made of 2-inch pipe, is sturdy and occupies a minimum of space on the derrick floor. It has sufficient base width to allow a number of tools to be supported without bolting the rack to the floor. Rod arm extensions have been spaced to handle wrenches of varying sizes. Welded into a one-piece unit, the rack supports chain tongs, pulleys, crow bars, wrenches, spades and shovels and other small tools apt to be needed. Time is saved by the drilling crew by not having to look for straying tools.



**This rack supports chain tongs pulleys, crow bars, wrenches, spades, shovels and other small rig tools.**

*"He say—'Nordstrom Valve no stickee, no leakee.'"*




EMCO-NORDSTROM TYPE

## DON'T WAIT FOR LEAKS TO WARN YOU

In handling gas, chemicals, slurries, oil or other fluids, the ordinary valve is subject to leakage caused by packing failure, improper seating, channeling and corrosion. In the Nordstrom Lubricated Valve the plug is never separated from its seat. None of the line contents can enter between the seat and plug; none can clog the valve to prevent a tight closure.

The patented "Sealdport" system of Nordstrom Valve lubrication comprises an arrangement of lubricant grooves whereby, when the plug is in closed position, the seat between body and plug is provided with a complete framework of lubricant grooves, all interconnected and surrounding the port in the body. Hydraulic pressure is applied by the lubricant screw.

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*Sealdport Lubrication*

**MERCO NORDSTROM VALVE COMPANY** — *a Subsidiary of* Pittsburgh Equitable Meter Company

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# Tailor-Made Insurance Offered Drilling-Rig Owners

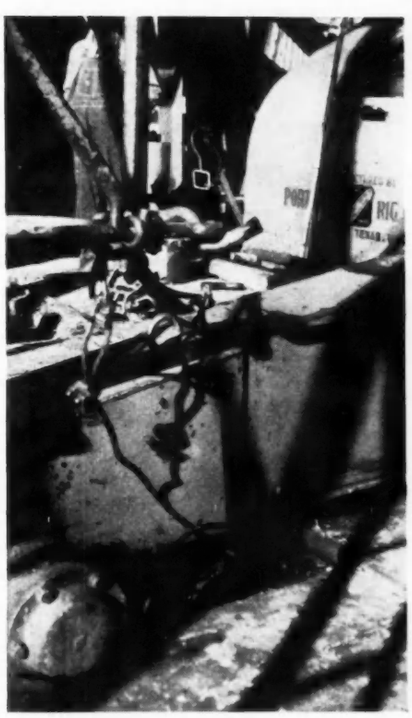
By ARTHUR C. BURNETT, Langham Insurance

IN the fight for production, the modern driller's technical armament consists largely of specialized weapons—made to order materials, special tools and instruments and specially developed techniques. In fact, almost every step from the geologists' suspicion of a new field to the motorist's certainty of a full tank is a specialized step, except the insurance policies involved. These have been, until recently, mere patchwork adaptations of the same printed forms commonly issued to the butcher, the baker and the candle stick maker. Now, however, they are for the first time being specially designed and drafted to serve the oil well drilling policyholder's individual requirements.

What does this mean to drilling contractors and rig owners? It means that they can now specify and buy exactly the protection they want instead of the protection some insurance office chair warmer, who never saw an oil well in his life, thinks they ought to want and has therefore embedded in a standard printed form. For instance, suppose a contractor wants to carry his own insurance to the extent that he would not ask for indemnity unless his annual losses exceeded $5000, or $25,000, or $50,000, he can now have such a contract prepared. Perhaps a contractor may want to insure all property, except boilers, or perhaps he desires a plan which would provide that nothing would be insured for more than 50 percent of its value and collect in proportion. This, too, can be done with the policies now available. Moreover, insurance rates may be left open, subject to application of a schedule of rates in the contract and adjusted at the end of the year or every three months, after calculating the time the rig was in this or that area and with due regard to depth, proximity to gas-charged sands, etc. A contractor can cover against fire only, or explosion and blowout, cratering, tornadoes, tidal waves, flood, etc. He can include or exclude loss of drill stem as he pleases.

If drilling in an area where damage to such property as land, buildings, water, etc., may be a hazard, insurance can be extended to cover such claims against the contractor or the firm for whom he is drilling.

With it all, rig owners can now get a real inspection service, rendered by oil engineers, men who have had practical experience as well as training afforded by the best universities. These men visit the location, interview the men in charge, examine the records, observe the methods being used, check the availability of reserve supplies, note the safety conditions, and report the findings to the general office, just as a boiler inspector services large manufacturing corporations whose activities are so widespread as to make constant supervision by the company inspectors impossible. Such outside data, so obtained is, too, more reliable than that offered by the men of the organization, just as the audit of a certified public accountant is accepted by disinterested outsiders more readily than the report of the bookkeeper on the job.



**Pipe tongs snubbed with a wire line to the rotary table prevent injury to workmen if the slips should not grip the tool joint, and cat line jerk forward.**

This new kind of tailor-made insurance policy is not printed. No two are alike and all are typed for that reason. Each drilling contractor or oil operator asks for some kind of protection, or requests the elimination of some hazard and gets it.

Perhaps the most interesting part of this new program is that while a set of rates are placed in the policy and these rates are guaranteed to be the maximum in any event, the contract has a special provision by which the owner receives back such part of the premium paid as is not required to pay losses and expenses. Even the expenses to be charged and the profit and reserves to be set aside are shown in the contract, item by item. All these unusual features have been adopted after several months' discussion between insurance executives and South Texas and Louisiana petroleum engineers and drilling contractors. Geophysicists, too, have had a hand in the remaking of this type of coverage which is unique in that for perhaps the first time in the history of insurance the contract to be offered will be drawn, not by the insurance company, but by the man who is going to pay for it and be protected by it.

It has proven especially attractive to those companies who operate a large number of drilling rigs in areas which have entirely different hazards, therefore, requiring specialized insurance. Most of this property has hitherto been uninsured because of the inability of the owner to write his own specifications.

# This Year Bringing Nearly As Much Drilling As 1937

By L. J. LOGAN, Associate Editor

DESPITE some unfavorable developments in the crude and refined oil markets, the petroleum industry of the United States maintained drilling on an exceptionally active basis in May.

In practically all normal or prosperous years, oil producers increase their field development work seasonally in April and May, because of favorable weather and expanding demand for gasoline. And this year was not an exception.

After having averaged 71.6 wells daily in February, United States completions increased progressively to 78.1 daily in March, 80 daily in April, and 87 daily in May.

The 87 completions daily in May of this year compared with 70.9 daily in May of last year, an increase of 22.5 percent. And they were not far under the 91.6 completions a day in May of 1937, most active year in the history of the industry except 1920.

Average daily well completions in May of recent years have been as indicated in an accompanying table.

| May of: | Wells Completed Daily |
|---|---|
| 1933 | 25.1 |
| 1934 | 55.5 |
| 1935 | 69.1 |
| 1936 | 81.6 |
| 1937 | 91.6 |
| 1938 | 79.7 |
| 1939 | 70.9 |
| 1940 | 87.0 |

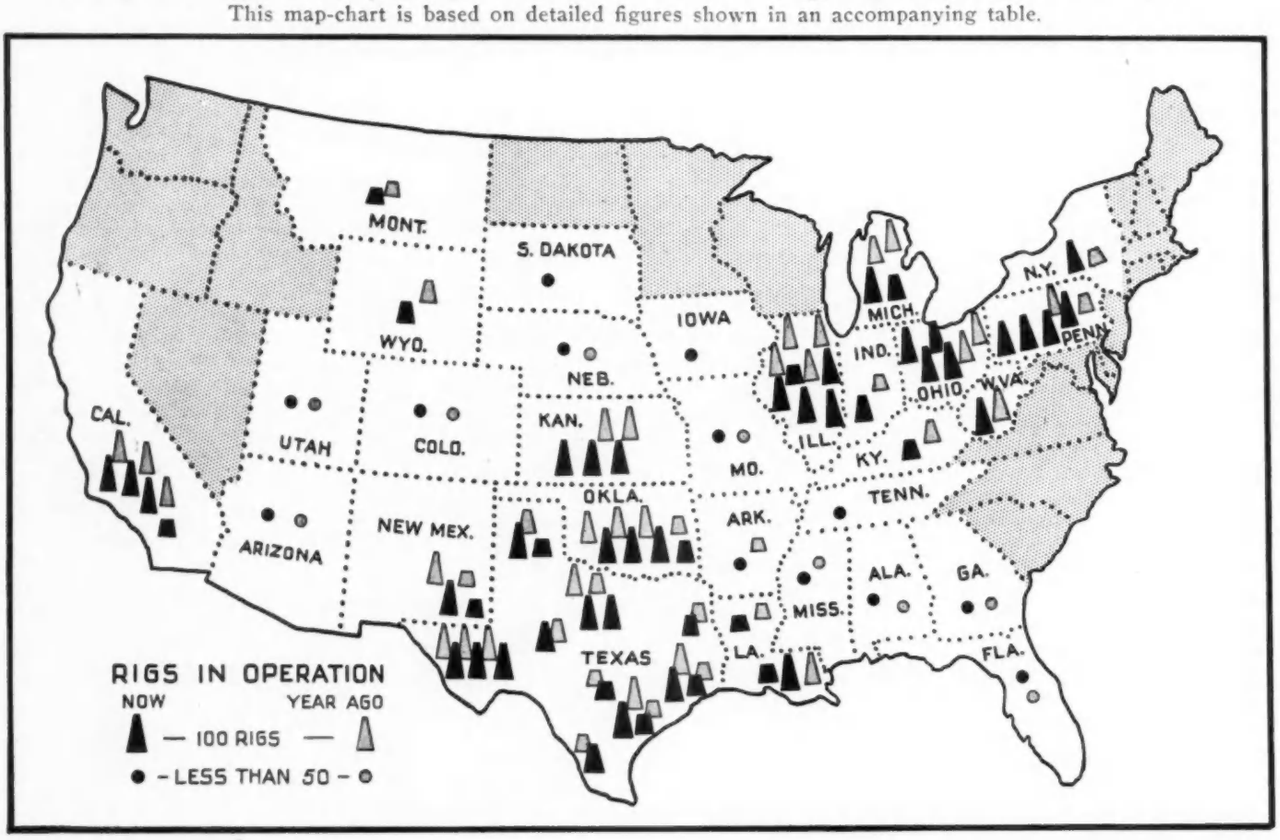
In the first four months of this year, drilling was a little over 25 percent greater than in the corresponding months of last year; and approximately the same margin above the 1939 record was maintained in May, with the result that 28 percent more wells had been completed in the first five months of 1940 than in the corresponding period of 1939.

So far, this year has been closely comparable with the extraordinary year 1937 in drilling activity, although April and May of this year did not bring the unusual spurts that occurred in those months of 1937.

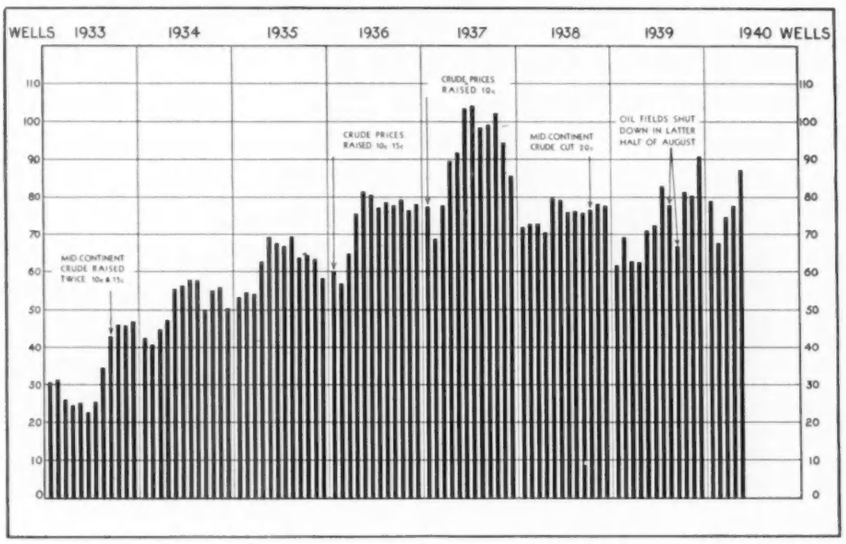
Through April, cumulative completions of 1940 slightly exceeded the comparable completions of 1937. For in the early months of this year, drilling was more active

## More Rigs in Use Now Than Year Ago in Most Districts

This map-chart is based on detailed figures shown in an accompanying table.



## Average Daily Well Completions in U. S., by Months




than in the like months of 1937.

By the end of May, however, the cumulated completions of 1940 failed quite to equal the corresponding completions of 1937.

The explanation of this variance from the 1937 trend is the fact that the spring of 1937 brought a remarkable expansion of drilling, while only a normal seasonal increase has occurred this spring, over the comparatively high levels of the past winter.

Indicated in an accompanying table are the average daily well completions in each of the first five months of both 1937 and 1940.

| Month | Wells Completed Daily In 1937 | Wells Completed Daily In 1940* |
|---|---|---|
| January | 77.2 | 81.5 |
| February | 68.6 | 71.6 |
| March | 77.5 | 78.1 |
| April | 89.8 | 80.0 |
| May | 91.6 | 87.0 |

* Revised for all months except May.

Cumulative completions for the first five months of recent years have been as indicated in another accompanying table.

| First 5 Months of: | Total Wells Completed |
|---|---|
| 1933 | 4,244 |
| 1934 | 7,096 |
| 1935 | 8,663 |
| 1936 | 9,958 |
| 1937 | 12,526 |
| 1938 | 11,398 |
| 1939 | 10,353 |
| 1940 | 12,244 |

Accompanying figures on wells completed in May cover 4 weeks, or 28 days, ended May 25, 1940, and consequently are not directly comparable with those given on completions in April, 1940, or May, 1939, as data for both of those months embraced periods of 5 weeks, or 35 days. Reduction of all the figures to a daily average basis reveals, however, how present drilling compares with that a month ago and that a year ago.

Nearly all districts contributed to the expansion of over 25 percent in completions in May, 1940, compared with May, 1939. Districts that were exceptional, through having furnished fewer completions per day, included Arkansas, Kentucky, Michigan, Ohio, Oklahoma, Wyoming, the East Texas field and each of the areas of Southwest Texas, including the Corpus

## Well Completions in 1940, Far Above 1939 Record, Nearly Same as in 1937

| STATE OR DISTRICT | [1]May, 1939, Total Completions | [2]April, 1940, Total Completions | [3]MAY, 1940, COMPLETIONS | | | | | CUMULATIVE COMPLETIONS IN FIRST FIVE MONTHS, 1939 AND 1940 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Total Wells | | | Details of 1940 Completions | | | |
| | | | Total Wells | Oil | Gas | Dry | Initial Oil Production | 1939 | 1940 | Percent Change | Oil | Gas | Dry | Initial Oil Production |
| Alabama | .... | .... | .... | .... | .... | .... | ..... | 1 | .... | ..... | .... | .... | .... | ..... |
| Arkansas | 20 | 22 | 12 | 8 | 1 | 3 | 2,269 | 87 | 78 | — 10.2 | 57 | 3 | 18 | 19,291 |
| California | 108 | 131 | 113 | 102 | 3 | 8 | 69,925 | 429 | 499 | + 16.1 | 425 | 9 | 65 | 308,707 |
| Colorado | 2 | 1 | .... | .... | .... | .... | ..... | 11 | 3 | — 72.7 | .... | .... | 3 | ..... |
| Georgia | 1 | .... | .... | .... | .... | .... | ..... | 1 | .... | ..... | .... | .... | .... | ..... |
| Illinois | 324 | 338 | 293 | 252 | 1 | 40 | 136,262 | 1,441 | 1,439 | — 0.1 | 1,221 | 13 | 205 | 985,977 |
| Indiana | 20 | 42 | 28 | 8 | 3 | 17 | 577 | 61 | 156 | + 155.7 | 70 | 21 | 65 | 7,795 |
| Kansas | 128 | 162 | 175 | 124 | 7 | 44 | 177,153 | 494 | 690 | + 39.6 | 534 | 19 | 137 | 776,012 |
| Kentucky | 57 | 28 | 18 | 8 | .... | 10 | 342 | 252 | 98 | — 61.1 | 51 | 1 | 46 | 2,797 |
| Louisiana | 109 | 164 | 149 | 109 | 8 | 32 | 24,100 | 402 | 651 | + 61.9 | 485 | 36 | 130 | 106,344 |
| North Louisiana | 36 | 61 | 51 | 40 | 6 | 5 | 4,639 | 160 | 234 | + 46.2 | 165 | 31 | 38 | 18,239 |
| South Louisiana | 73 | 103 | 98 | 69 | 2 | 27 | 19,461 | 242 | 417 | + 72.3 | 320 | 5 | 92 | 88,105 |
| Michigan | 147 | 119 | 72 | 35 | 4 | 33 | 6,461 | 512 | 506 | — 1.2 | 286 | 13 | 207 | 60,513 |
| Mississippi | 1 | 16 | 22 | 10 | .... | 12 | 3,813 | 2 | 72 | +3500.0 | 42 | 1 | 29 | 24,628 |
| Missouri | .... | 1 | 3 | .... | 1 | 2 | ..... | ..... | 5 | ..... | .... | 1 | 4 | ..... |
| Montana | 10 | 17 | 18 | 16 | 2 | .... | 1,762 | 43 | 62 | + 44.1 | 49 | 4 | 9 | 5,488 |
| New Mexico | 62 | 84 | 51 | 44 | .... | 7 | 18,859 | 239 | 315 | + 31.8 | 253 | 10 | 52 | 99,521 |
| New York | [4]38 | [4]103 | [4]77 | [4]76 | .... | 1 | 220 | [4]191 | [4]442 | + 131.4 | [4]430 | 4 | 8 | 2,003 |
| Ohio | 86 | 30 | 54 | 39 | 6 | 9 | 381 | 322 | 296 | — 8.1 | 149 | 89 | 58 | 1,290 |
| Oklahoma | 243 | 250 | 167 | 102 | 6 | 59 | 28,226 | 831 | 896 | + 7.8 | 494 | 66 | 336 | 151,769 |
| Pennsylvania | [4]124 | [4]293 | [4]248 | [4]220 | 22 | 6 | 301 | [5-4]805 | [5-4]1,463 | + 81.7 | [4]1,270 | 118 | 75 | 1,153 |
| Tennessee | .... | 2 | 1 | .... | .... | 1 | ..... | ..... | 7 | ..... | 2 | 1 | 4 | 533 |
| Texas | 950 | 951 | 881 | 642 | 17 | 222 | 372,893 | 3,976 | 4,280 | + 7.6 | 3,063 | 116 | 1,101 | 1,817,310 |
| East Texas Field | 34 | 27 | 21 | 18 | .... | 3 | 25,270 | 234 | 123 | — 47.4 | 116 | .... | 7 | 220,396 |
| Rest of East Texas | 27 | 22 | 25 | 7 | 4 | 14 | 2,002 | 118 | 106 | — 10.1 | 42 | 23 | 41 | 15,331 |
| North Texas | 182 | 197 | 196 | 138 | .... | 58 | 99,455 | 622 | 939 | + 41.8 | 634 | 5 | 300 | 376,084 |
| South Texas | 280 | 281 | 206 | 126 | 2 | 78 | 55,291 | 1,171 | 1,124 | — 4.0 | 690 | 27 | 407 | 250,536 |
| Corpus Christi Area | 150 | 131 | 114 | 79 | .... | 35 | 42,990 | 549 | 528 | — 3.8 | 370 | 12 | 146 | 191,003 |
| Laredo Area | 99 | 120 | 75 | 41 | 2 | 32 | 12,133 | 444 | 492 | + 10.8 | 288 | 15 | 189 | 56,102 |
| San Antonio Area | 31 | 30 | 17 | 6 | .... | 11 | 168 | 178 | 104 | — 41.5 | 32 | .... | 72 | 3,431 |
| Texas Gulf Coast | 135 | 102 | 129 | 117 | 1 | 11 | 30,211 | 604 | 525 | — 13.1 | 398 | 9 | 118 | 104,567 |
| Texas Panhandle | 43 | 53 | 50 | 42 | 7 | 1 | 12,032 | 150 | 241 | + 60.6 | 202 | 33 | 6 | 69,019 |
| West Texas | 214 | 207 | 178 | 163 | 2 | 13 | 144,923 | 859 | 901 | + 4.9 | 831 | 6 | 64 | 736,979 |
| West Central Texas | 35 | 62 | 76 | 31 | 1 | 44 | 3,709 | 178 | 321 | + 80.3 | 150 | 13 | 158 | 44,398 |
| Utah | .... | .... | 1 | .... | 1 | .... | ..... | ..... | 1 | ..... | .... | 1 | .... | ..... |
| West Virginia | 43 | 30 | 48 | 11 | 28 | 9 | 105 | 211 | 226 | + 7.1 | 52 | 134 | 40 | 401 |
| Wyoming | 11 | 18 | 5 | 4 | .... | 1 | 6,308 | 42 | 60 | + 42.8 | 48 | 3 | 9 | 41,937 |
| Total United States | 2,484 | 2,802 | 2,436 | 1,810 | 110 | 516 | 849,957 | 10,353 | 12,244 | + 28.2 | 8,981 | 663 | 2,601 | 4,413,469 |

[1] Wells completed in the 5 weeks, or 35 days, ended May 27, 1939. [2] Wells completed in the 5 weeks, or 35 days, ended April 27, 1940.
[3] Wells completed in the 4 weeks, or 28 days, ended May 25, 1940. [4] Includes water-input wells.
[5] Bradford completions for first four months revised in accordance with The Producer's Monthly.

## Rigs in Use Now Exceed Those of Year Ago 21.3 Percent

| STATE OR DISTRICT | TOTAL RIGS IN OPERATION Drilling, Rigs Up, Shut-down | | | | DETAILS OF JUNE 1, 1940 FIELD ACTIVITY | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Rigs in Operation | | | Prelim. Activity | | |
| | June 1 1939 | May 1 1940 | June 1 1940 | Percent Change from Year Ago | Drilling | Rigs Up | Shut-down | Derricks | Locations | Total Operations |
| Alabama | 2 | 2 | 4 | + 100.0 | 3 | 1 | ... | ... | ... | 4 |
| Arizona | 6 | 7 | 8 | + 33.3 | 4 | 1 | 3 | ... | 1 | 9 |
| Arkansas | 47 | 27 | 32 | — 31.9 | 21 | 4 | 7 | 2 | ... | 34 |
| California | 290 | 342 | 329 | + 13.4 | 213 | 87 | 29 | ... | 45 | 374 |
| Colorado | 23 | 29 | 30 | + 31.8 | 6 | 2 | 22 | ... | 2 | 32 |
| Florida | 5 | 3 | 3 | — 40.0 | ... | ... | 3 | 1 | ... | 4 |
| Georgia | 1 | 2 | 2 | + 100.0 | 2 | ... | ... | ... | ... | 2 |
| Illinois | 391 | 301 | 468 | + 19.7 | 351 | 51 | 66 | 18 | 45 | 531 |
| Indiana | 48 | 83 | 79 | + 64.6 | 43 | 2 | 34 | 6 | 18 | 103 |
| Iowa | ... | 2 | 2 | ..... | ... | ... | 2 | ... | ... | 2 |
| Kansas | 224 | 287 | 306 | + 36.6 | 248 | 41 | 17 | 25 | 13 | 344 |
| Kentucky | 78 | 55 | 59 | — 24.3 | 27 | 2 | 30 | ... | 3 | 62 |
| Louisiana | 189 | 184 | 206 | + 8.9 | 181 | 18 | 7 | 10 | 35 | 251 |
| North Louisiana | 66 | 36 | 55 | — 16.7 | 45 | 5 | 5 | 2 | 2 | 59 |
| South Louisiana | 123 | 148 | 151 | + 22.8 | 136 | 13 | 2 | 8 | 33 | 192 |
| Michigan | 193 | 175 | 165 | — 14.5 | 95 | 40 | 30 | ... | 37 | 202 |
| Mississippi | 9 | 31 | 36 | + 300.0 | 23 | 5 | 8 | 4 | 6 | 46 |
| Missouri | ... | 18 | 17 | ..... | 6 | 1 | 10 | ... | ... | 17 |
| Montana | 44 | 42 | 43 | — 2.3 | 15 | 4 | 24 | ... | 2 | 45 |
| Nebraska | 1 | 20 | 14 | +1300.0 | 7 | 1 | 6 | ... | ... | 14 |
| New Mexico | 145 | 142 | 155 | + 6.9 | 110 | 8 | 37 | ... | 18 | 173 |
| New York | 53 | 95 | 107 | + 101.9 | 72 | 20 | 15 | 10 | 15 | 132 |
| Ohio | 201 | 202 | 394 | + 96.0 | 215 | 136 | 43 | 68 | 41 | 503 |
| Oklahoma | 363 | 368 | 364 | + 0.3 | 267 | 31 | 66 | 39 | 30 | 433 |
| Pennsylvania | 161 | 415 | 388 | + 140.9 | 262 | 74 | 52 | 36 | 49 | 473 |
| South Dakota | ... | 2 | 2 | ..... | 1 | ... | 1 | ... | ... | 2 |
| Tennessee | ... | 6 | 6 | ..... | 4 | ... | 2 | ... | 1 | 7 |
| Texas | 1,179 | 1,303 | 1,247 | + 5.8 | 990 | 99 | 158 | 57 | 422 | 1,726 |
| East Texas Field | 14 | 14 | 9 | — 35.7 | 7 | 1 | 1 | 1 | 3 | 13 |
| East Texas Border Co.'s | 16 | 13 | 15 | — 6.3 | 9 | 2 | 4 | 2 | ... | 17 |
| Rest of East Texas | 37 | 45 | 35 | — 5.4 | 20 | 2 | 13 | 4 | 2 | 41 |
| North Texas | 176 | 250 | 214 | + 21.6 | 168 | 9 | 37 | 13 | 90 | 317 |
| South Texas | 288 | 305 | 298 | + 3.5 | 235 | 29 | 34 | 19 | 78 | 395 |
| Corpus Christi Area | 165 | 156 | 156 | — 5.4 | 136 | 12 | 8 | 8 | 36 | 200 |
| Laredo Area | 66 | 85 | 80 | + 21.2 | 58 | 13 | 9 | 7 | 28 | 115 |
| San Antonio Area | 57 | 64 | 62 | + 8.8 | 41 | 4 | 17 | 4 | 14 | 80 |
| Texas Gulf Coast | 151 | 151 | 152 | + 0.7 | 145 | 6 | 1 | 9 | 50 | 211 |
| Texas Panhandle | 97 | 122 | 137 | + 41.2 | 100 | 24 | 13 | ... | 39 | 176 |
| West Texas | 321 | 291 | 293 | — 8.7 | 253 | 9 | 31 | 9 | 123 | 425 |
| West Central Texas | 79 | 112 | 94 | + 18.9 | 53 | 17 | 24 | ... | 37 | 131 |
| Utah | 3 | 7 | 7 | + 133.3 | 6 | ... | 1 | ... | ... | 7 |
| West Virginia | 102 | 116 | 119 | + 16.7 | 91 | 10 | 18 | 5 | 16 | 140 |
| Wyoming | 79 | 61 | 63 | — 20.3 | 14 | 3 | 46 | 4 | 9 | 76 |
| Total United States | 3,837 | 4,327 | 4,655 | + 21.3 | 3,277 | 641 | 737 | 285 | 808 | 5,748 |

Christi, Laredo, and San Antonio districts.

Most districts, similarly, participated in the seasonal increase of drilling from April to May, 1940. However, average daily completions were lower in May than in April in Indiana, Kentucky, Michigan, New Mexico, Oklahoma, Wyoming, and the Laredo and San Antonio districts of Southwest Texas.

Some of those mentioned states and districts also are among the minority that show fewer cumulative completions for 1940 than for 1939. The areas that did not have as much drilling in the first 5 months of this year as in the corresponding months last year included Arkansas, Colorado, Kentucky, Michigan, Ohio, the East Texas field, the remainder of Eastern Texas, the Corpus Christi and San Antonio districts of Southwest Texas, and the Texas Gulf Coast.

Various local conditions have been responsible for the failure of the mentioned states and districts to show increases in field development in line with the country as a whole.

Arkansas does not have this year the active development of new fields that it had last year. Kentucky has proved a disappointment to those who had hoped for important discoveries in the state comparable with those in Illinois. Michigan was especially active last year, as development of the shallow fields of the southwestern part of the state proceeded; but new discoveries have been scarce this year, and in the absence of proved new areas, completions have lagged. Oklahoma has continued to feel the loss of markets to Illinois, and with demand for the state's crude relatively low, the incentive to drill has been limited.

California has been more active this year than last year, in the face of less favorable markets for both crude and refined oils; although drilling quite possibly may be curtailed during the remainder of the year, as the difficulties in the markets have become more serious.

Despite the failure to find important new fields and the advance of the established fields toward the drilled-up stage, Illinois has had an impressive drilling record so far this year, and the state still is comparatively active.

Adjoining Indiana has had more than twice as many completions as in 1939, but there was some slowing down of development in May.

Noteworthy increases in drilling have occurred this year in the Appalachian region, in response to repeated raises last year in the prices of Pennsylvania-grade crude. It is to be expected, however, that drilling henceforth will be retarded as Pennsylvania-grade oil was cut 25 cents a barrel May 22, because of the steady decline of lubricant prices since the early part of this year.

The outstanding increase in drilling this year over last year has been that in Mississippi, where 72 wells were completed in the first 5 months of 1940, against only 2 in the corresponding period of 1939.

Aside from those in Mississippi, Indiana, and the Eastern States, some of the largest increases in drilling this year have occurred in the Rocky Mountain states of Wyoming and Montana.

New Mexico has had an expansion in drilling similar to that for the United States as a whole, but development was down contra-seasonally in May.

In view of the inroads that Illinois has made into the markets formerly supplied by Kansas, drilling has been surprisingly active this year in the latter state. Some Kansas operators doubtless are taking the view that Illinois has passed its production peak and henceforth will give up some of its markets to states of the Mid-Continent.

North Louisiana drilling has been up 46 percent this year, and South Louisiana has furnished 72 percent more completions than in 1939.

Texas has furnished only 8 percent more new wells in 1940 than in 1939, but there have been gains of 80 percent in West Central Texas, 61 percent in the Panhandle, and 42 percent in North Texas, while smaller increases have occurred in West Texas and the Laredo area of South Texas.

### Rigs in Operation

Rigs in operation in the United States increased from 4327 on May 1, 1940, to 4655 on June 1, as the seasonal expansion of drilling proceeded, and the number in use at the beginning of June was 21 percent greater than that of 3837 on June 1, 1939. Those totals indicate a continuation of brisk drilling during June. The figures include wells drilling, rigging up, or temporarily shut down, and details by districts appear in an accompanying table.

# HIGHLIGHTS IN THE WEEK'S NEWS

## Washington

### *War Department Told Industry Can Meet Defense Demands*

Representatives of the oil industry last week assured Army and Navy officials of the industry's ability to meet any and all oil needs raised by President Roosevelt's national defense program.

The industry was represented by William R. Boyd, of the American Petroleum Institute, Fayette B. Dow, of the National Petroleum Association of America; Pennsylvania Grade Crude Oil Association, and the Western Petroleum Refiners Association, and Russell B. Brown, of the Independent Petroleum Association of America.

The group informed Army and Navy department officials that the industry is better prepared than ever before to meet the increased demand for oil products that may result from the proposed expansion of the national defense.

Among the factors contributing to this preparedness are trained personnel familiar with the operations of the industry, and a greater amount of known underground reserves than at any previous time in history.

It was explained that an adequate labor supply is very important because the activities of the industry are so varied and widespread as to make difficult the training of new men whose inexperience might prove expensive. The refinery capacity of the industry, government officials were told, is sufficient to take care of any immediate increase in demand, and can be added to more rapidly than new machinery requiring petroleum products can be manufactured.

### *Sadler Asks Halt to U. S. Oil Reaching Nazis*

Contending that Germany until recently was getting approximately 220,000 barrels of American oil a day, and even now is getting about 40,000 barrels a day, Texas Railroad Commissioner Jerry Sadler last week urged upon officials of the state and interior departments the desirability of cutting off the supply of oil to the Nazis.

Commissioner Sadler told officials of the two departments that the oil was being shipped from the United States to various European ports, from where it eventually reached Germany.

His trip to Washington was the result of a controversy arising at a recent meeting of the commission, at which he sought to have a resolution adopted condemning the shipment of crude or refined oil to Italy. The resolution was opposed by oil producers on the ground that Italy was not a belligerent.

### *Propose 50 Percent Hike In Federal Gasoline Tax*

Imposition of a 10 percent "supertax" on lubricating oil and an increase of ½ cent per gallon in the federal tax on gasoline are provided for in a national defense revenue bill drafted last week by the House Ways and Means Committee.

The bill is designed to raise $656,000,000 a year for the next five years, to finance President Roosevelt's $3,000,0000,000 national defense program.

It is estimated that the increased tax on lubricating oil will bring in something under $1,500,000 a year but that the increase in the gasoline tax will produce $112,000,000.

In addition to the direct taxes on oil and other commodities, the bill will provide for a 10 percent supertax on individual and corporate income and a 20 percent increase in the transfer tax on stocks and bonds.

Because the imposition of a ten-percent supertax would make computation difficult, the bill provides that the tax on lubricating oils shall be increased from 4 to 4½ cents per gallon and the levy on transportation of oil by pipe line shall be increased from 4 to 4½ cents.

The Ways and Means Committee on Friday interrogated Secretary of the Treasury Morgenthau regarding the financial needs for the coming fiscal year, and sought to pave the way for consideration of the bill in the house this week.

### *Cole Bill Believed Dead For This Session*

Failing a demand by the Administration for additional authority, no action is expected this session on the Cole bill to vest the Secretary of the Interior with authority over the production of oil.

It was explained by the committee that the final volume of the hearings held some time ago has not yet been printed, and that the committee will not consider the bill until all the testimony is available.

At the same time, it was indicated, no effort is being made to speed up the printing, which includes an index of witnesses and subjects, and that there was little disposition on the part of the committee to attempt to push the measure this year.

In the event the president asks for authority over industry to insure a constant and adequate flow of needed commodities, the bill may be revived; but in view of the fact that the oil industry today is operating at a very low percentage of possible production, it is not believed it will be the subject of such a move.

## News Index


**General:**

| | |
|---|---|
| A.P.I. | 11 and 49 |
| Allowables | 47 |
| Washington | 47 |
| Associations | 48 |
| **Men in News** | 53 |
| **Markets-Statistics** | 54 |
| **Crude Prices** | 56 |
| **World Wide Developments** | 58 |

**U. S. Field Operations:**

| | |
|---|---|
| Alabama | 72 |
| Arkansas | 71 |
| California | 73 |
| Completions | 74 |
| East Texas | 61 |
| Forest City Basin | 64 |
| Illinois | 62 |
| Indiana | 64 |
| Kansas | 61 |
| Kentucky | 64 |
| Louisiana Coast | 70 |
| Michigan | 73 |
| Mississippi | 72 |
| North Louisiana | 71 |
| North Texas | 65 |
| New Mexico | 64 |
| Oklahoma | 61 |
| Rocky Mountain | 73 |
| Southwest Texas | 68 |
| Texas Gulf Coast | 69 |
| West Texas | 65 |
| Wildcat Development | 78 |


## Allowables

### *June Allowables Call for Strict Control of Crude*

Exceptionally strict control of crude oil production has been scheduled for June, as the prorated states have adopted allowables that conform closely with the Bureau of Mines etimates of market demand.

Consequently, the accumulation of crude oil in storage, which was reduced to small proportions in May, is likely to be eliminated completely in June. It appears quite possible, in fact, that some crude may be taken out of storage during the month.

Eight prorated states, which account for 83 percent of all United States crude oil production, have scheduled June allowables which are in the aggregate 9589 barrels daily, or 3/10 of 1 percent, below the indicated average daily market demand, as estimated by the Bureau of Mines.

In April the same states had allowables 249,066 barrels daily above market requirements, and within the month, crude stocks in the United States increased about 7,000,000 barrels. In May, the group adopted stricter allowables, having exceeded indicated demand 107,680 barrels daily; and in consequence, practically no net change in crude stocks occurred between May 1 and May 18, latest date for which figures are available, while no important change appeared likely for the month as a whole. However, crude runs to stills were exceptionally large in May, having established a new all-time record in the week ended May 18, and if the runs had been more moderate and in accordance with market needs, some crude would have been forced into storage, instead of being processed at the refineries.

Similarly, the exact reaction of crude stocks to the prescribed allowables of June will depend on the proportions of refinery runs. Even if runs should be exceptionally moderate, there should not be any material backing up of crude in storage, with the production strictly curtailed. And if the runs should continue heavy, refiners would absorb not only all the current allowed production but also substantial quantities from storage. Conceivably, with the plants especially active, crude stocks might be reduced as much as 3,000,000 barrels in June.

Under June allowables, Texas, Oklahoma, and California will restrict crude production slightly below indicated market demand, and Kansas and New Mexico will conform exactly with estimated market requirements. Arkansas and Louisiana, meanwhile, will slightly exceed the indicated market demand

## Crude Production Allowables for June Conform Closely With Indicated Market Demand

**(Barrels Daily)**

| STATE | Bureau of Mines Estimate of Demand | State Allowable Beginning of Month | Excess or Deficiency of State Allowable | Percent Excess or Deficiency |
|---|---|---|---|---|
| Arkansas | 66,700 | 70,515 | + 3,815 | + 5.7 |
| California | 593,700 | *592,000 | — 1,700 | — 0.3 |
| Kansas | 159,000 | †159,000 | ..... | ..... |
| Louisiana | 274,700 | 278,566 | + 3,866 | + 1.4 |
| Michigan | 62,000 | 56,000 | — 6,000 | — 9.7 |
| New Mexico | 106,700 | 106,700 | ..... | ..... |
| Oklahoma | 408,600 | 408,100 | — 500 | — 0.1 |
| Texas | 1,344,600 | ‡1,335,530 | — 9,070 | — 0.7 |
| Total eight states | 3,016,000 | 3,006,411 | — 9,589 | — 0.3 |
| Other states | 604,300 | ..... | ..... | ..... |
| Total United States | 3,620,300 | ..... | ..... | ..... |

*Recommendation of Central Committe of California Oil Producers.
† Estimated same as Bureau of Mines forecast of demand, as state has been adopting bureau figures as allowables.
‡ Daily average, considering general shutdown June 1, and 14 shutdown days in East Texas Field.

for their oil. Michigan, although prorated, does not establish state allowables, but it is estimated that actual production in June will fall somewhat short of indicated market demand.

The state allowables for June and Bureau of Mines estimates of demand for the various states appear in an accompanying table.

# Pipe Line

### *Pipe Bought for 110-Mile West Texas Oil Line*

The Texas New Mexico Pipe Line Company is surveying right-of-way for the construction of a 110-mile 8⅝-inch oil pipe line to extend from the Duggan-Slaughter district, northernmost producing area in West Texas, to Midland, where connection will be made with Gulf Refining Company's double 8-inch system, which will transport the oil on a common carrier basis to Crane station, Crane County. The former will accept deliveries into its 12-inch line to Houston at Crane station.

New pipe has been purchased for the building of the line, but station requirements and capacity will not be determined until survey is complete. Construction work will not get under way until 60 to 90 days.

The Texas Company, representing 55 percent stock interest in The Texas New Mexico Pipe Line Company, is one of the largest producers and lease owners in the Duggan-Slaughter district, which has about 30,000 acres of proved leases. The area is currently depending upon crude purchases by a refinery at Levelland and tank truck shipments to the Wasson field, both involving price concessions borne by producers.

### *Clear Right-of-Way for 96-Mile West Texas Line*

Right-of-way is being cleared for construction of Basin Pipe Line Company's 96-mile 6-inch crude line to connect the Wasson field, largest oil area in West Texas, with Cosden Petroleum Corporation's refinery at Big Spring, Texas. The latter has contracted to purchase 5000 barrels of crude daily for five years, paying the prevailing price posting of majors at the well, plus transportation, and five Wasson field producers have contracted to sell their allowable production for a like period. This pipe line has been under consideration since last December.

O. C. Whitaker Company, Fort Worth, has contract to build the carrier and lay 11½ miles of 4-inch gathering lines. First pipe is due to arrive June 8, and construction is to be completed by mid-July. A booster station will be erected on the southeast edge of the Wasson field, and an intermediate station will be installed later.

### *Federal Taxes on Oil Industry Continue Heavy in April*

Treasury collections from the federal taxes on the oil industry continued heavy in April, but revenue from levies on lubricating oils and transportation by pipe line failed to maintain their March levels, it was disclosed this week by the United States Internal Revenue Bureau.

Gasoline tax collections increased to $15,184,770 from $14,909,664 in March and were practically unchanged from April, 1939, when $15,182,328 was received, the bureau reported.

Receipts from lubricating oils declined for the third successive month, dropping from $2,074,041 in March to $2,026,048 in April, where they were some $164,000 under the $2,190,594 collected in the same month last year.

Pipe line transportation paid taxes of $806,633, more than $225,000 under the $1,032,149 reported for March, but $72,000 above the $734,658 collected in April, 1939.

For the first four months of the year, however, collections from all three taxes were ahead of 1939, the gasoline tax returning $67,715,332 against $62,617,157, lubricating oil $9,351,988 against $8,688,679, and pipe line transportation $3,897,700 against $3,588,820.

The three levies combined will return to the Treasury considerably more for the fiscal year which ends June 30 than was received in the 1939 year, the bureau stated. For the first ten months of the fiscal year, the gasoline tax returned $186,142,430, a gain of $13,296,754 over the $172,845,676 reported to the end of April, 1939; lubricating oils returned $25,454,751, a gain of $3,118 over $25,451,633, and pipe line transportation returned $9,440,297, a gain of $326,325 over $9,113,972.

### *West Texas Geological Field Trip June 8-9*

The annual field trip of the West Texas Geological Society, Midland, will be held June 8-9 in the Sacramento Mountains, south central New Mexico. Members and guests will assemble at High Rolls, near Alamogordo, at 8 a. m. June 8.

### *Kentucky Association Meets At Lexington, June 21-22*

The annual mid-summer meeting of the Kentucky Oil & Gas Association will be held at Lexington June 21-22.

Officers of the group are N. W. Shiarella, president; M. A. Arvin, M. G. Powers and P. C. Van Gilst, vice presidents; E. L. McDonald, secretary, and Paul D. Bushong, assistant secretary-treasurer.

### *Carter Awards Contract for Tulsa Scientific Building*

Waller-Wells Construction Company, Tulsa, has been awarded contract by The Carter Oil Company for a new research building at Tulsa to be ready for occupancy by November 1.

The plant will be used for designing and building all geophysical and production equipment of a specialized nature not obtainable on the open market, for its own use, and for the parent Standard Oil Company of New Jersey, its subsidiaries and its affiliated companies.

## Bureau of Mines Foresees Continued Good Domestic Demand for Gasoline, and Curtailed Exports

**(Barrels)**

| MONTH | Total Demand for Domestic Crude | MOTOR FUEL DEMAND | | |
|---|---|---|---|---|
| | | Domestic | Export | Total |
| **February:** | | | | |
| February, 1940, forecast | 102,340,000 | 37,300,000 | 2,800,000 | 40,100,000 |
| February, 1939, actual | 92,248,000 | 34,595,000 | 2,909,000 | 37,504,000 |
| Change from year ago | +10.9% | +7.8% | —3.9% | +6.9% |
| **March:** | | | | |
| March, 1940, forecast | 108,520,000 | 45,100,000 | 3,400,000 | 48,500,000 |
| March, 1939, actual | 103,887,000 | 42,520,000 | 4,336,000 | 46,856,000 |
| Change from year ago | +4.5% | +6.1% | —21.6% | +3.5% |
| **April:** | | | | |
| April, 1940, forecast | 106,500,000 | 47,500,000 | 2,800,000 | 50,300,000 |
| April, 1939, actual | 104,578,000 | 43,977,000 | 3,663,000 | 47,640,000 |
| Change from year ago | +1.9% | +8.0% | —23.6% | +5.6% |
| **May:** | | | | |
| May, 1940, forecast | 111,630,000 | 52,400,000 | 2,800,000 | 55,200,000 |
| May, 1939, actual | 111,666,000 | 49,547,000 | 4,390,000 | 53,937,000 |
| Change from year ago | —0.03% | +5.7% | —36.8% | +12.3% |
| **June:** | | | | |
| June, 1940, forecast | 108,610,000 | 53,200,000 | 2,400,000 | 55,600,000 |
| June, 1939, actual | 109,239,000 | 49,812,000 | 4,459,000 | 54,271,000 |
| Change from year ago | —0.6% | +6.8% | —46.2% | +2.4% |

# Mid-Year A. P. I. Production Division Hears 13 Papers

FOUR sessions of the Division of Production at the mid-year meeting of the American Petroleum Institute, in Fort Worth last week, featured 13 papers on a variety of topics. A session devoted to well spacing and technology was told of the economic value of optimum well spacing, the importance of conserving gas- or water-drive energy, and that permeability of the formation apparently had little influence on the plastering behavior of mud fluids. One of the group meetings was devoted to drilling practices, at which time papers were delivered on depth measurements by means of multiple-strand wire lines, the economic significance of safety, and the practical utilization of rate of penetration drilling data.

The other two meetings of the division were on production practices and materials. In the former group, a speaker declared there had been little improvement in the prevention of paraffin accumulations but outlined numerous advancements in removal of deposits. Topics falling in the materials classification included engine cooling, laboratory and field endurance values of sucker rod materials, galvanic corrosion of dissimilar metals in salt-water solutions, setting depths for casing, development of a new thread lubricant, and problems entering in the selection of steel for oil production tools.

Abstracts of the papers follow:

### Optimum Spacing of Dolomite Acreage in the Texas Panhandle

BY PARK J. JONES
*Petroleum Engineer,*
*Fort Worth, Texas.*

Optimum spacing of wells can lower investments as much as 75 percent on some reservoirs, thereby reducing the cost of crude oil to consumers and freeing capital for exploration and development elsewhere. For example, in the Panhandle dolomite producing area, a $600-per-acre reduction in producing costs was made possible by 18-acre spacing of wells. Tables were presented to show that the present worth of future earnings after operating cost, taxes and amortization of wells representing $22,500 per well investment might be estimated at $1230 per acre with 18-acre spacing, but would amount to olny $630 per acre with 10-acre spacing. The tables were based on the following representative physical data: an allowable of 20 barrels daily irrespective of spacing; 365 operating days per year; an economic limit of 3 barrels per day; an investment of $22,500 per well; an operating cost of $1800 per well per year, including taxes; a one-eighth royalty, and interest at 6 percent. It therefore appears that the optimum spacing of the dolomite acreage in the Texas Panhandle is 18 acres per well at the present income of 98 cents per barrel of oil produced. A more general statement would be that the optimum spacing on dolomite acreage is one well per 136,000 barrels of recoverable oil. This conclusion would not hold if the allowable was not on a per-well basis.

Economic as well as physical variables must affect the optimum spacing of wells, especially since the investment in an oil well now ranges from $20,000 to $220,000, with a 6 percent interest rate doubling the principal each 12 years and the life of most wells running longer than 12 years.

### Review of the Principles of Oil-Reservoir Peformance

BY T. V. MOORE
*Humble Oil & Refining Company,*
*Houston, Texas.*

Control of the displacement of oil by gas or water should be the most important consideration in producing wells. To obtain high oil recovery, certain factors subject to control must be observed. Production of oil is accomplished by displacing the oil from the pores of the sand with either gas or water. In any case, some oil is left in the sand, because sands which contain only a small amount of oil do not transmit oil readily through their pores. Less oil is left in a sand from which oil has been displaced by water drive than would be left by a gas drive. In water-drive fields, it is important that production be slow enough to permit the water to flood the fine as well as the coarse sands. Gas caps should not be permitted to decrease in size due to production at excessive gas/oil ratio. Wells are important mechanical units, and must be completed properly, and kept in proper repair. A number of strategically located wells is necessary to provide for adequate control of the displacement of oil by water or gas, but otherwise the number of wells drilled is of minor importance.

T. V. Moore

The gas and water must be conserved; and, unless the reservoir contains an ample supply of these fluids to provide for the displacement of all recoverable oil, it may be advisable to return at least a portion of the gas or water produced to the reservoir.

### Effect of Formation Permeability on the Plastering Behavior of Mud Fluids

BY H. T. BYCK
*Shell Development Company,*
*Emeryville, Calif.*

It frequently has been assumed that loss of liquid from drilling mud increases with increased permeability of the formation penetrated. Several recent papers, which present a theoretical analysis of the filtration of muds, point out that this factor should have little or no influence upon mud plastering. The paper presented extensive experimental data to check this important point.

H. T. Byck

In order to establish the influence of this property of the formation upon water loss and sheath thickness, plastering experiments were made with a number of representative California muds on a high-pressure circulating filter press, using a series of real and synthetic consolidated cores whose permeabilities ranged from 10 to 14,600 millidarcys.

Results cast grave doubt upon the ability to force either cement slurries or whole mud into homogeneous formations; and it appears necessary to conclude that the appearance of mud or cement in wells adjacent to the one under consideration can take place only through crevices, channels, fractures or caverns, or through formations of extraordinarily high permeability—in fact, only through formations in which the pore sizes are so large as to cause the concept of permeability to lose its generally accepted meaning.

### Setting Depths for Casing

BY BLAINE B. WESCOTT
*Gulf Research & Development Company,*
*Pittsburgh, Pennsylvania*
*and*
C. A. DUNLOP
*Humble Oil & Refining Company,*
*Houston, Texas*
*and*
E. N. KEMLER
*Gulf Oil Corporation,*
*Tulsa, Oklahoma*

The advent of deep drilling has served to emphasize that the design of casing strings is an engineering problem. For this reason it is essential that minimum performance characteristics of casing be established and used, rather than the average properties. It is only by this procedure that confidence can be placed in the factors of safety computed.

After critical study, the following temporary minimum performance properties were proposed:

B. B. Wescott

Collapse pressure—75 percent of the "average collapsing pressures" in Bulletin 5-C-2;

Joint strength—85 percent of the average "ultimate-strength-of-joint" values in Bulletin 5-C-2;

Bursting yield strength—87.5 percent of the values for "internal pressure at minimum

C. A. Dunlop

yield strength" in Bulletin 5-C-2.

It was recommended that API pipe specifications for casing be revised so that grade classification is based on minimum limits specified for the performance properties, collapse pressure, joint strength, and bursting yield strength. Additional minimum requirements to insure adequate ductility also should be included.

### Development of a New Thread Lubricant

By H. J. Beckert *and* W. M. Frame

*National Supply Company, Spang Chalfant Division, Ambridge, Pa.*

A new thread lubricant has been developed that consists of 50 percent aluminum-soap grease and 50 percent natural Mexican clay-base graphite composed of both coarse and fine particles.

H. J. Beckert

W. M. Frame

It was said by the authors to be designed to meet the following six requirements:

1. Will not become too fluid up to 300 degrees F.
2. Will not disintegrate nor undergo radical changes in volume up to 300 degrees F.
3. Is stable, and contains no drier nor hardener to evaporate or oxidize, and thus change characteristics.
4. Has adequate lubricating qualities to prevent galling in the thread connection.
5. Will not readily absorb water.
6. Is readily appliable with a brush in cold weather.

### Problems Entering into the Selection of Steel for Oil-Production Tools

By H. W. McQuaid

*Republic Steel Corporation, Cleveland, Ohio*

Selection of an analysis for a given application involves many factors of cost, processing and design limitations. If a careful study is made of all factors which affect performance, such as deflection, stress concentration, abrasion, corrosion, wear, shock, and fatigue stresses, it may become possible to avoid relatively costly steel and treatments. This is not so difficult in new designs; but in existing designs it is often necessary to go to special steels of high first cost, which are usually expensive to process.

The selection of the best steel for a given part often is affected by the decision as to treatment or surface characteristics demanded.

H. W. McQuaid

A completely satisfactory selection, therefore, should involve the steel maker, the designer and the production department. A close cooperation between the designing engineer, the plant metallurgist, the plant superintendent, and the metallurgical staff of the steel supplier is important.

Emphasis should be placed on design and on the effect of design on fatigue, warpage, machining and processing.

### Depth Measurements by Means of Multiple-Strand Wire Lines

By Henry Gross *and* J. P. Hays

*Agricultural and Mechanical College of Texas, College Station, Texas.*

Greater accuracy in measuring the depth of oil wells so that measurements may check within one foot in 4000 feet is necessary, particularly in fields with thin-pay sands.

H. E. Gross

The only equipment essential to accurate measuring consists of a 100-foot steel tape, paint brushes and white enamel, adhesive tape, flashlight, a five-foot stick, soft-rope flags and a carpenter's square. There are various means of taking measurements accurately, including use of the sand line in cable-tool operations, using the drilling line, measuring with spudders, electric logging device, gun-perforating units, measuring by coring line, and by means of special devices employing multiple-strand wire lines. The proper procedure is to measure very carefully the distance of the cable or drilling line over the derrick between "fixed points" on the rig to the well head. This is the "yardstick" for subsequent depth measurements. The use of painted markers and flags on the cable was explained in detail.

J. P. Hays

### The Economic Significance of Safety

By R. B. Roaper

*Humble Oil & Refining Company, Houston, Texas.*

Promotion of safety in industrial operations is good business and contributes directly to efficiency necessary to assure the public of quality products at reasonable prices and employes a fair return on the expenditure of their labor. Accident-prevention efforts have economic as well as humanitarian aspects, and a well-planned and well-directed safety program can and will make a definite contribution to increased efficiency.

R. B. Roaper

Cases wherein drilling operations have been carried on for a full year without a disabling accident were reported, and the instance of a crew averaging 125 men with an annual payroll in excess of $300,000 was cited. Normally the premium for accident insurance would have cost more than $38,000, but because of the favorable safety record, it was reduced nearly $26,000. The cost of accident-prevention work in this case was estimated at less than $1650.

Steps recommended in promotion of accident prevention were precautionary efforts to assure safe working conditions, the holding of employe safety meetings, employe training to prevent human failure, and proper selection and maintenance of equipment, including tools. The utilization of safety agencies, such as the institute, were recommended also.

It was urged that the promotion of safety be considered at all times as simply good business.

### Practical Utilization of Rate-of-Penetration Drilling Data

By C. A. Yeatman

*Shell Oil Company, Inc., Los Angeles, Calif.*

The importance of rate-of-penetration achieved during drilling as a clue to classification of the type of formation being penetrated has been recognized for some time. The reduction of this factor from a casual observation to a strict measurement definitely has increased its value not only as an indicator of the type of formation being penetrated by the drill, but also as an aid in the development of more economical drilling technique.

C. A. Yeatman

The use of recording instruments in conjunction with the analysis of drilling penetration speeds as yet has not been sufficiently extensive to develop a complete estimate of its usefulness, but has evidenced the following points of value:

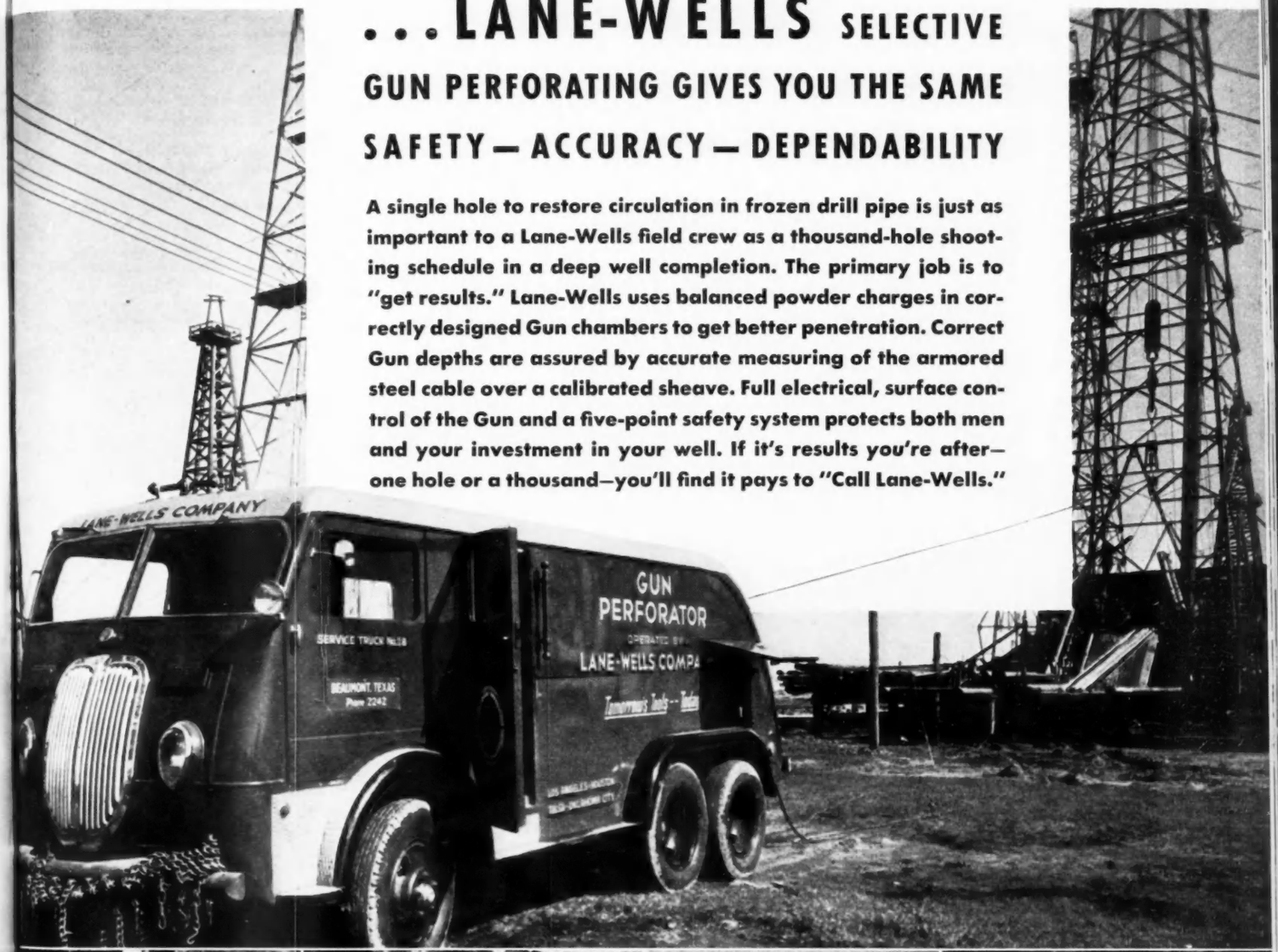
1. Its correlation with the results obtained from electric logging is desirable, as it develops information, while, rather than after, drilling operations are in progress; and moreover it aids in eliminating doubtful interpretations of formation changes.
2. It promotes "formation consciousness" with drillers, and thereby encourages closer observance of formation changes.
3. It provides an accurate means of analyzing the economy of established drilling-bit-renewal practices.
4. It aids in determining coring intervals in wildcat wells. Furthermore, when ditch samples are collected, it has been of considerable value in the attendant correlation and classification of such samples.

Equipment developed for automatically

# One hole or a thousand

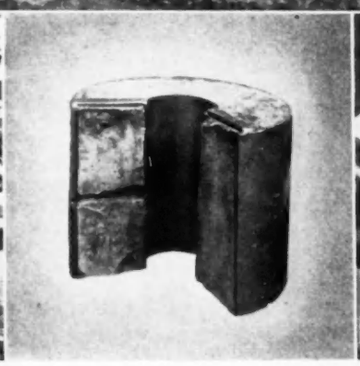
## . . . LANE-WELLS SELECTIVE GUN PERFORATING GIVES YOU THE SAME SAFETY — ACCURACY — DEPENDABILITY

**A single hole to restore circulation in frozen drill pipe is just as important to a Lane-Wells field crew as a thousand-hole shooting schedule in a deep well completion. The primary job is to "get results." Lane-Wells uses balanced powder charges in correctly designed Gun chambers to get better penetration. Correct Gun depths are assured by accurate measuring of the armored steel cable over a calibrated sheave. Full electrical, surface control of the Gun and a five-point safety system protects both men and your investment in your well. If it's results you're after—one hole or a thousand—you'll find it pays to "Call Lane-Wells."**

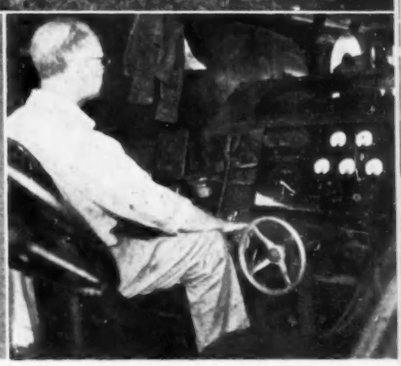


*Each numbered chamber is given a final test on the derrick floor to check the electrical connections.*

*Each Gun port is checked after every run before a new chamber is inserted.*



*5 9/16" of steel and cement in this perforated section of casings demonstrate high penetrating power.*



*In the truck the Shooter is in constant communication with the Derrick Man. Full electrical controls are located here.*

LANE WELLS
TECHNICAL OILFIELD SERVICES
Everywhere

recording drilling penetration rates includes a reservoir, which is mounted on the swivel block and forms a part of the drilling assembly. To the reservoir is attached a hose, which leads to a container on which is assembled a standard pressure gage. The reservoir, hose and container assembly then are filled with water, and the drilling progress thereafter is portrayed graphically on the pressure gage, appearing there as a direct function of the recorded pressure or head of water. The record obtained with the device presents the automatic plotting feet drilled vs. time. To interpret this automatic plotting, a template is used. The template, constructed of a transparent material, consists of a series of curves, plotted as feet vs. time, each of which depicts a definite drilling rate. The template is superimposed on the record and is shifted until a close coordination between one of the template curves and the charter curve is observed.

**Engine Cooling**

By Earl B. Clossom
*Barnsdall Oil Company,*
*Los Angeles, California*
*and*
Herbert Wirshing
*Waukesha Motor Company,*
*Los Angeles, California*

There are opportunities for increased operation efficiency through thermal improvement, and through improved cooling better maintenance records may be procured. The condition of the cooling system is reflected throughout the entire machine. The advantages of moderately high jacket temperatures were shown.

There are three principal types of cooling systems, radiator, heat-exchanger, and enclosed coils in cooling towers. They have a similarity of problems of operation, high jacket temperatures and proper water treatment. An automatic temperature control, which does not restrict water flow through jackets, is of vital necessity to operation and low maintenance.

Radiator cooling demands consideration of jacket-water circulation, core size, fan size and temperature regulators. The shell-and-tube heat exchanger should be given consideration in installations wherein the engine is used to pump liquids. Cooling towers, when available, are highly satisfactory. Enclosed-coil systems take care of themselves, reducing maintenance costs. "Vapor-phase" cooling makes use of the latent heat of water. By a simple arrangement, it becomes possible not only to operate the engine at high temperature, but automatically to maintain this temperature through any range of engine output and ambient temperature.

**Prevention and Removal of Paraffin Accumulations**

By W. Y. Brown
*The Carter Oil Company,*
*St. Elmo, Illinois.*

Mindful that crude oils produced from a greater portion of United States fields contain waxy or paraffinic components which will precipitate and accumulate under proper conditions, and that the severity of the paraffin problem in producing fields is governed both by the characteristics of the oil and the conditions under which it is removed from the reservoir, the following conclusions were drawn from a recently completed questionnaire survey sponsored by the institute:

1. The problem of paraffin removal and prevention is about equal in severity to that

**W. Y. Brown**

experienced 10 years ago. Although conservation policies in most states have tended toward alleviation of the problem, the production-rate limitations governed by proration laws, in an approximate measure equally have aggravated paraffin depositions, particularly in young natural flowing fields.

2. Other than a widespread adoption of principles promoting gas conservation and increased ultimate recovery, nothing of note has been applied successfully during the past decade for preventing accumulations.

3. Some progress has been made, however, in the direction of removing the accumulation after it has occurred. This progress includes development of automatic scrapers for tubing of flowing wells, marked improvements in wire-line scraping equipment, and betterment of commercial chemicals and the technique of applying them.

4. Although the primary factor influencing preference for any paraffin removal method is cost, no single technique for handling a given type of deposition can be recommended universally.

5. There has been a general decline in the use of steam as a paraffin-removal technique, due to the replacement of steam by other means as pumping power.

6. Fields lying in the northern climates suffer more from paraffin, due to the direct effect of atmospheric temperature.

Ways and means for removing paraffin accumulations now popularly employed in the oil fields were discussed in some detail.

**Laboratory and Field Endurance Values of Sucker-Rod Materials**

By D. R. Dale *and* D. O. Johnson
*The S. M. Jones Company.*

There is need for standardization on endurance-value tests in comparing sucker-rod materials, and also for modification of the tests to simulate more closely actual field conditions.

Until all endurance-value data have been established on a standard basis, endurance values of two steels, for instance, should be compared only when run with identical brines and speeds under properly standardized laboratory conditions. Unless this precaution is taken, false, and even dangerous, conclusions may be obtained which easily could result in costly material applications. As the large amount of published data at this time is based on 1750 revolutions per minute with established synthetic brine, this procedure offers the largest field for safe material comparisons—until other data, at standard slower speeds and with actual field brines, are available on a sufficient scale.

**D. R. Dale**

**D. O. Johnson**

There has been considerable progress in testing sucker rod materials. Starting with air endurance tests, we have reached the place where, on a few steels, we are able to correlate field and laboratory results. On many steels, the actual oil field brine data have been used, and these soon will be correlated with field results.

**Galvanic Corrosion of Dissimilar Metals in Salt Water Solutions**

By H. R. Copson
*International Nickel Company, Inc.*
*Bayonne, New Jersey.*

Many dissimilar metals are in contact in oil wells, and as the wells often contain a brine solution that readily permits a flow of current, an investigation of the galvanic effects between these metals is pertinent.

**H. R. Copson**

Research has shown that the galvanic effects produced by coupling different grades and tempers of carbon steel with each other are negligible. But when carbon steels used for drill pipe, casing and tubing are in contact with alloy steels used for casing and tool joints, the potential differences are in such direction as to protect the alloy steels and therefore cause corrosion of the carbon steels because of the electrolytic action. It is evident that the rate of such corrosion depends upon the amount of surface exposed to attack, and that the effect is less intensive in those wells where oxygen from the air is present in reduced amounts. Freqeuntly, the oxygen supply is the controlling factor, although the rate of corrosion is influenced also by temperature, composition and relative motion of the brine solution.

## *A.P.I.*

[*Continued from page 14*]

cause they never have been told adequately and because they are willing to listen to "traducers of the industry because they think it is wealthy, big and predatory—making too much money."

"Institutional all-industry advertising is primarily the way to put the true story of the industry and the oil companies before the people," asserted Truesdell. "Advertising in the oil papers to reach the people employed in the industry, advertising in general media to reach those outside the industry."

It is no longer enough to do a good job and to expect that accomplishments will speak for themselves, he said, adding: "We must speak up, straight from the shoulder, and tell our story—a true story and a good story. We must tell it in interesting fashion so that people will read it, understand it, and believe it.

The best way to safeguard our industry is to enlist the people we serve as our active friends. Institutional advertising, backed wholeheartedly by the entire industry, and followed up by well-executed advertising programs of individual companies, is the way to do it."

# MEN IN THE INDUSTRY'S NEWS

**O. D. DONNELL,** The Ohio Oil Company, has been named chairman of the American Petroleum Institute's Division of Production 1940 committee on standard procedure for measuring, sampling and testing crude oil. W. R. Trelford, Humble Oil & Refining Company, is vice chairman.

Members are D. S. Bushnell, Northern Group of Pipe Lines; W. M. Holland, The Ohio Oil Company, Casper; Nelson K. Moody, Sinclair Prairie Oil Marketing Company, Tulsa; and W. L. Stewart, Union Oil Company of California, Los Angeles.

Subcommittee chairmen are Correlating committee—Trelford; Group 1 subcommittee on uniform tank measurements and gage tables—Ray F. Shumaker, Sinclair Refining Company, Independence, Kansas; Group 2 technical subcommittee on methods of test for crude oil—R. P. Anderson, American Petroleum Institute; Group 3 regional subcommittee on pipe lines—E. L. Adams, General Petroleum Corporation; Group 4 national subcommittee of oil accountants—A. L. Carlson, Stanolind Pipe Line Company, Tulsa, and Group 5 subcommittee on marine transportation—Trelford.

**E. R. SPENCER,** assistant chief engineer for Texas-Empire Pipe Line Company, Tulsa, will be awarded an honorary degree in engineering by the State College of Washington June 3 in recognition of his work in the internal combustion engine field.

**HENRY LINAM,** president of Standard Oil Company of Venezuela, and A. T. Proudfit, manager of eastern Venezuelan operations for the company, returned to South America last week after spending some time in the United States.

**VAUGHAN C. MALEY,** West Texas geologist for Humble Oil & Refining Company, has been transferred from Midland to Hattiesburg, Mississippi, where he will have charge of geological operations for the company in Mississippi, Alabama and Florida.

**A. R. EPPENAUER,** West Texas producer with headquarters at Pecos, spent the fore part of last week in Tucson, Arizona, visiting a daughter who was stricken with appendicitis.

**JOSEPH L. QUINN** has been appointed chief scout and assistant land agent for The Pure Oil Company in the Texas division. He will make his headquarters in Fort Worth.

**GEORGE BRUNDRETT,** engineer for Fain-McGaha Oil Corporation, has been transferred from Stamford to Wichita Falls, Texas.

**A. C. CALVERT,** superintendent for Barnsdall Oil Company, has been transferred from Skiatook, Oklahoma, to Galena, Kansas.

**DR. MALVIN G. HOFFMAN,** former chief geologist for Midco Oil Corporation, Tulsa, has resigned to engage in consulting work at 1321 South Quaker, Tulsa. He was associate professor of geology at Washington State College for 6 years, and has been associated with Midco Oil Corporation for the past 4 years.

**DAN J. MORAN,** president of Continental Oil Company, heads a party of 35 company officials who started last week on their annual inspection tour of company properties. The trip is being made by bus, and the group will cover 8000 miles in 15 states.

**R. F. NIVEN** has been named assistant secretary of Union Oil Company of California, Los Angeles. He entered the company's employ in 1932.

**WILLIAM E. KENNETT,** geologist for Superior Oil Company, has been transferred from Coalinga to Girard, California.

**JOHN H. BAXTER,** engineer for Red Bush Producing Company, has been transferred from Ashland, Kentucky, to Bartlesville, Oklahoma.

**HENRY N. GREIS** will head a new company to take over Deep Rock Oil Corporation, under a reorganization plan approved by Federal Judge Kennamar in Tulsa last week. The plan must be approved by July 15 by a majority of the company's note holders and preferred stockholders.

Greis, for more than 25 years engaged in the active production of oil and gas in the Mid-Continent, heads Burke-Greis Oil Company and has been a director of Mid-Continent Petroleum Corporation since 1922. Born on July 5, 1880, he went to public school in Lancaster, Pennsylvania, finished high school at Buffalo, and then entered the United States Military Academy at West Point.

**HENRY N. GREIS**

**K. S. ADAMS,** president, headed a party of Phillips Petroleum Company officials who toured properties in the Permian Basin of West Texas and New Mexico last week. Those in the group included C. O. Stark, vice president in charge of land and geological departments; Dean E. Lounsbery, chief geologist; Dave C. Hemsell, superintendent of the land department; R. F. Hamilton, secretary to the executive committee; Arthur M. Hughes, vice president in charge of marketing; M. P. Youker, vice president in charge of refining; C. P. Dimit, vice president in charge of production; Charles Musgrave, vice president in charge of transportation; L. E. Fitzgerald, assistant superintendent of production; A. M. Sands, vice president in charge of economics; Paul Endicott, assistant to the president; E. F. Guidinger, manager of the oil sales division, and F. E. Rice, vice president in charge of natural gasoline production, all of Bartlesville; Mark A. Taylor, manager of marketing, and Charles Daniels, production superintendent for West Texas and the Panhandle, both of Amarillo; Paul A. Schlosser, district geologist; R. R. Herrell, district land man, and W. M. Wilkinson, geologist, all of Midland.

**GEORGE CALLIHAN,** operator and drilling contractor of Albany, Texas, was in Havana, Cuba, last week in connection with a 5000-foot test he will drill about 45 miles from that city.

**D. B. GOOD,** Texas Empire Pipe Line Company, and W. I. Wilkins, Gulf Oil Corporation, discussed protective coatings for pipe lines before the Engineers Club of Tulsa last week.

**MAX LYON,** engineer for The Carter Oil Company, has been transferred to La Junta, Colorado, from St. Joseph, Missouri.

**H. V. WARD** has been transferred from the Tulsa laboratory of Shell Oil Company to Wichita. Joe Lindner, from Wichita Falls, will replace him.

**PIERCE BROOKS,** Dallas; Baker Saulsburg and John Paul Jones, both of New London, last week filed as candidates for Texas railroad commissioner.

**SAM W. WELLS** and C. B. Peters, Tulsa operators, have transferred to Corpus Christi to operate as Norbia Oil Company.

**DR. MAYNARD WHITE,** Gulf Oil Corporation, will present a paper before the Ardmore Geological Society June 3.

**P. D. BOWLEN,** president of Tex-Canadian Oil Corporation, has shifted his headquarters from Arp to Tyler, Texas.

**WILLIAM CARTER BRISSEY,** 77, Oklahoma oil operator, died May 23 after a year's illness. He had been active as a producer since the Red Fork discovery in 1901.

**COLIN REITH,** petroleum engineer for Bahrein Petroleum Company, is vacationing at his home in California.

## *Gasoline Stocks Lowered As Crude Runs Come Down*

Latest weekly statistics of the petroleum industry showed no material change in crude oil production but a curtailment of runs to stills, which resulted in a substantial withdrawal of gasoline from bulging storage. The industry meanwhile continued to build up stocks of heating oils for use next fall and winter, and there was a withdrawal of heavy fuel oils from storage.

### Production and Runs

United States crude production averaged 3,835,650 barrels daily in the week ended May 25, the American Petroleum Institute reported, an increase of 550 barrels over the rate in the previous week. The well output was 7 percent greater than in the corresponding week last year.

Crude runs to stills were reduced to 3,580,000 barrels daily from the all-time record of 3,665,000 barrels established in the previous week, a decrease of 85,000 barrels. The runs were, nevertheless, 5 percent greater than the daily average of 3,412,000 barrels for May of last year.

### Gasoline Situation

Production of gasoline was reduced to 11,498,000 barrels in the week of May 25 from 11,523,000 barrels in the preceding 7 days. Last year, gasoline production averaged 11,205,000 barrels weekly in May. Consequently, the latest week's output was nearly 300,000 barrels in excess of the corresponding production last year.

Gasoline stocks were lowered over 700,000 barrels in the week ended May 25, having been reduced from 101,015,000 to 100,297,000 barrels. The latter quantity was, however, nearly 15,500,000 barrels, or 18 percent, greater than that of 84,845,000 barrels on hand May 27, 1939. Inasmuch as the stocks a year ago were excessive, and since demand is not a great deal larger this year than last year, it is indicated that present stocks embody a surplus of around 15,000,000 barrels.

### Fuel Oil Stocks

Stocks of light fuel oils gradually are being increased into a better relationship to expanded market demand. An addition of a little over a million barrels in the week ended May 25 raised the stocks of gas oil and distillate fuel in the United States to 28,356,000 barrels. That quantity was 3 percent greater than the supply of 27,553,000 barrels held on May 27 last year. However, market requirements have increased by a large percentage, and a continued exceptional build-up of stocks will be needed to avoid scarcity next fall and winter.

Stocks of heavy fuel oils were reduced 230,000 barrels in the week ended May 25, having come down from 104,245,000 to 104,015,000 barrels. At the latter level, the residual fuel oil inventory was 6.5 percent smaller than a year previously, when supplies totaled 110,855,000 barrels.

Crude oil stocks were increased over a half million barrels in the week ended May 18, the Bureau of Mines reported, the United States total of refinable crude having risen to 257,647,000 barrels. However, that amount was 7 percent less than that held a year previously.

## *Prices of Gasoline and Fuel Oils Are Lowered*

The industry's markets lately have not performed very well, wholesale quotations on various products having been lowered within the past 10 days and a general mark-down of retail prices of gasoline having occurred on the Pacific Coast.

The gasoline market has become further unsettled, moreover, in other parts of the country, and it appears extremely doubtful that much improvement of prices will occur this summer.

The national inventory of gasoline still is above 100,000,000 barrels, and that quantity is proving to be definitely too great to permit satisfactory prices. The stocks apparently embody a surplus of at least 15,000,000 barrels, and no unusual withdrawals are being made.

On the contrary, refinery runs are being maintained on a large scale, and they probably will be kept high because of the need for building up heating oil stocks as well as that for turning out relatively large quantities of other products, which are in good demand.

The logical solution for the gasoline surplus is an exceptional restriction of the yield of gasoline from the barrel of crude, and the industry has evidenced some definite efforts in that direction.

### Fuel Oils Marked Down

While the pressure on the gasoline market has been a significant feature of the general market situation, there has been weakness also in the markets for both light and heavy fuel oils, although the lowering of heating oil quotations probably has been of seasonal nature.

In the Mid-Continent, some refiners have reduced by ⅛ cent a gallon their top quotations on light fuel oils. On the Atlantic coast, light fuel oils were available last week for reduced prices.

Kerosene prices also have been lowered along the Atlantic seaboard, as much as ½ cent a gallon in some instances.

Bunker C fuel oil was marked down 10 cents a barrel by some refiners on the Gulf Coast, and reductions of as much as 15 cents were announced by some sellers in New York harbor.

Diesel oil also was marked down, in some instances as much as 20 or 25 cents a barrel, in both the Gulf Coast and New York markets.

Meanwhile, major companies foresee the possibility of a scarcity again next winter in heating oil supplies, as evidenced by announcements of several concerns setting in their contracts with consumers higher top prices for the six months from December 1, 1940, to May 31, 1941, than for the six months from June 1, 1940, to December 1, 1940. The tops specified for six months hence are ½ cent a gallon higher than those fixed for the current period.

### Gasoline Cut on West Coast

Instituting the first downward revision in retail gasoline prices since January 10, 1936, Standard Oil Company of California early last week ordered price reductions

## PRODUCT PRICES

| | Range Last Week (Cents a gal.) | Late | Changes from week Before | |
|---|---|---|---|---|
| **REFINED GASOLINE** | | | | |
| **Oklahoma Refineries:** | | | | |
| 60 Octane and under | 4 | 4¼ | ... | ... |
| 63-66 Octane | 4¼ | 4⅝ | ... | ... |
| 72-74 Octane | 4⅝ | 5¼ | ... | ... |
| **Mid-Western Tank Car:** | | | | |
| 60 Octane and under | 4 | 4¼ | ... | ... |
| 63-66 Octane | 4⅝ | 4⅝ | ... | ... |
| 72-74 Octane | 4⅝ | 5¼ | ... | ... |
| **New York Harbor:** | | | | |
| 70 Octane and under | 6¼ | 6¼ | ... | ... |
| 72-74 Octane | 6¼ | 6¾ | ... | ... |
| **NATURAL GASOLINE** | | | | |
| **Grade 26-70:** | | | | |
| F.O.B. Group 3 | 1⅛ | 1⅛ | ... | ... |
| F.O.B. Breckenridge, Texas | 1¼ | 1¼ | ... | ... |
| **KEROSENE** | | | | |
| **Oklahoma Refineries:** | | | | |
| 41-43 water white | 4 | 4¼ | ... | ... |
| 42-44 water white | 4⅛ | 4⅝ | ... | ... |
| **Mid-Western Tank Car:** | | | | |
| 41-43 water white | 4 | 4¼ | ... | ... |
| 42-44 water white | 4⅛ | 4⅝ | ... | ... |
| **New York Harbor** | 6 | 6 | ... | ... |
| **RANGE OIL** | | | | |
| At Oklahoma Refineries | 3⅝ | 3⅞ | ... | ... |
| In Mid-Western Market, Group 3 basis | 3¾ | 3⅞ | ... | ... |
| **LIGHT FUEL OILS** | | | | |
| **Oklahoma Refineries:** | | | | |
| No. 1 straw | 3⅜ | 3⅝ | ... | —⅛ |
| No. 3 | 3¼ | 3⅜ | ... | ... |
| **Mid-Western Tank Car:** | | | | |
| No. 1 straw | 3½ | 3⅝ | ... | ... |
| No. 3 | 3⅛ | 3⅜ | ... | ... |
| **New York Harbor:** | | | | |
| No. 1 | 6 | 6 | ... | ... |
| No. 3 | 4¾ | 5½ | —½ | ... |

| | Range Last Week (Cents a gal.) | Late | Changes from week Before | |
|---|---|---|---|---|
| **HEAVY FUEL OILS** (Per Barrel) | | | | |
| **Oklahoma Refineries:** | | | | |
| No. 6 | .50 | 55 | ... | ... |
| **Mid-Western Tank Car:** | | | | |
| No. 5 | .75 | 75 | ... | ... |
| No. 6 | .45 | 55 | ... | ... |
| **New York Harbor:** | | | | |
| No. 5 | $1.70 | $1.85 | ... | ... |
| No. 6 | 1.35 | 1.50 | —.15 | ... |
| **BUNKER C FUEL OIL** (Per barrel, ships bunkers) | | | | |
| Gulf Coast | $ .80 | $ .95 | —.10 | ... |
| New York Harbor | 1.35 | 1.50 | —.15 | ... |
| **DIESEL OIL** (Per barrel, ships bunkers) | | | | |
| Gulf Coast | $1.50 | $1.70 | —.20 | ... |
| New York Harbor | 1.95 | 2.20 | —.25 | ... |
| Los Angeles Basin, 27 gravity | 1.15 | 1.40 | ... | ... |
| **LUBRICATING OIL** | | | | |
| **Oklahoma Refineries:** | | | | |
| Bright stock, 150-160 viscosity at 210°, 10-25 pour test | 17½ | 20½ | ... | ... |
| Neutral oil, pale, No. 3 color, 150 viscosity at 100°, 0-10 pour test | 10½ | 11¾ | ... | ... |
| **Western Pennsylvania:** | | | | |
| Bright stock, 145-155 viscosity, at 210°, 25 pour test | 19 | 20 | ... | ... |
| Neutral Oil, No. 3 color, 150 viscosity, at 70°, 25 pour test | 20 | 20 | ... | ... |

on all grades of motor fuel sold in the Pacific Coast territory. The price cuts amounted to 2½ cents a gallon on premium fuels, 1½ cents on regular grades and 2 cents on competitive grades. The new retail prices posted in the Los Angeles metropolitan area were: Ethyl gasoline, 18½ cents; second structure, 16½ cents; and third structure, 14½ cents.

The general price reduction ended three years and two months of stabilized gasoline price structures in the Pacific Coast territory, the last change having been made March 23, 1937, when regular-brand fuels were advanced a half cent a gallon to 18 cents.

The cut in gasoline prices followed closely upon discontinuance of provisions for disposal of distress gasoline in the Southern California area by the larger marketers, in consequence of the Supreme Court decision upholding convictions in the Madison cases. At the same time, the marketing division of the industry on the West Coast also is under indictment in federal court on charges of Sherman Anti-Trust Law violations, an action which is expected to proceed to trial late this summer.

General price cuts ordered by Standard were quickly followed by other marketing units in the territory, although in several instances under protest. Shell Oil Company, among others, voiced its opposition to the lower postings. Independent marketers, most of whom operate in the Los Angeles area, expressed the belief they could retain upwards of 50 percent of their former volume of business by selling their products one cent below major company postings. About half of the independent refineries have closed down operations since loss of their outlet for distress-gasoline produc-

## Trends of United States Production and Stocks

**Figures are from American Petroleum Institute weekly reports, except those on crude stocks, which are from Bureau of Mines weekly reports**

| WEEK ENDED | Crude Oil Production (Barrels Daily) | Crude Runs to Stills (Barrels Daily) | Crude Oil Stocks (Barrels) | Gasoline Stocks (Barrels) | FUEL OIL STOCKS | |
|---|---|---|---|---|---|---|
| | | | | | Gas Oil & Dist. Fuels | Residual Fuel Oil |
| **1937:** | | | | | | |
| August 28 | [5]3,731,450 | 3,425,000 | 309,506,000 | 66,997,000 | 112,111,000 | |
| September 25 | 3,666,300 | [5]3,455,000 | 307,974,000 | 65,620,000 | 116,472,000 | |
| **1938:** | | | | | | |
| March 19 | 3,433,550 | 3,080,000 | 306,380,000 | [5]93,192,000 | 122,067,000 | |
| November 12 | 3,243,250 | 3,180,000 | 273,394,000 | [5]67,551,000 | 34,175,000 | 120,491,000 |
| December 10 | 3,245,100 | 3,150,000 | [6]269,509,000 | 68,687,000 | 32,068,000 | 118,711,000 |
| December 31 | 3,201,450 | 3,115,000 | 273,024,000 | 71,695,000 | 29,082,000 | 115,741,000 |
| **1939:** | | | | | | |
| January 28 | 3,248,250 | 3,235,000 | 271,763,000 | 77,279,000 | 26,583,000 | 112,766,000 |
| February 25 | 3,328,850 | 3,185,000 | 271,758,000 | 84,597,000 | 23,419,000 | 110,252,000 |
| March 25 | 3,382,350 | 3,225,000 | 273,915,000 | 87,561,000 | 21,487,000 | 107,551,000 |
| April 22 | 3,526,700 | 3,280,000 | 277,156,000 | [2]87,769,000 | 21,085,000 | 105,035,000 |
| April 29 | 3,568,200 | 3,405,000 | 278,440,000 | 86,794,000 | [7]25,844,000 | [7]108,409,000 |
| May 6 | 3,580,900 | 3,275,000 | [2]278,607,000 | 86,216,000 | 26,167,000 | 108,597,000 |
| May 27 | 3,585,250 | 3,405,000 | 278,289,000 | 84,152,000 | 26,992,000 | 109,386,000 |
| June 24 | 3,452,800 | 3,430,000 | 272,297,000 | 81,733,000 | 30,239,000 | 111,726,000 |
| July 29 | 3,539,100 | 3,460,000 | 268,513,000 | 77,887,000 | 34,900,000 | 114,053,000 |
| August 5 | [1]3,909,400 | 3,445,000 | 268,982,000 | 76,431,000 | 35,601,000 | 114,512,000 |
| August 26 | [2]1,690,800 | 3,475,000 | 246,982,000 | 73,475,000 | 37,722,000 | 116,237,000 |
| September 30 | 3,658,200 | 3,560,000 | 233,023,000 | 71,168,000 | 38,081,000 | 115,466,000 |
| October 7 | 3,435,850 | 3,505,000 | 231,564,000 | [8]71,152,000 | 38,549,000 | 114,397,000 |
| October 21 | 3,771,550 | [3]3,650,000 | [3]229,127,000 | 72,122,000 | 39,358,000 | 115,060,000 |
| October 28 | 3,498,500 | 3,520,000 | 230,453,000 | 72,660,000 | 39,562,000 | 114,786,000 |
| November 25 | 3,818,100 | 3,510,000 | 231,811,000 | 75,595,000 | 38,527,000 | 112,106,000 |
| December 30 | 3,545,000 | 3,445,000 | 237,742,000 | 80,985,000 | 34,184,000 | 106,680,000 |
| **1940:** | | | | | | |
| January 27 | 3,611,600 | 3,470,000 | 237,339,000 | 87,914,000 | 27,407,000 | 103,015,000 |
| February 24 | 3,732,100 | 3,490,000 | 240,836,000 | 96,719,000 | 25,390,000 | 103,419,000 |
| March 30 | 3,841,250 | 3,585,000 | 250,561,000 | 101,370,000 | 23,778,000 | 105,081,000 |
| April 20 | 3,858,550 | 3,535,000 | 254,881,000 | [1]102,817,000 | 24,779,000 | 103,323,000 |
| April 27 | 3,845,250 | 3,555,000 | 256,670,000 | 102,452,000 | 24,997,000 | 102,552,000 |
| May 4 | 3,679,050 | 3,505,000 | 258,210,000 | 102,063,000 | 25,658,000 | 103,043,000 |
| May 11 | 3,825,450 | 3,620,000 | 257,079,000 | 101,317,000 | 26,552,000 | 103,985,000 |
| May 18 | 3,835,100 | [1]3,665,000 | 257,647,000 | 101,015,000 | 27,345,000 | 104,245,000 |
| May 25, 1940 | 3,835,650 | 3,580,000 | ..... | 100,297,000 | 28,356,000 | 104,015,000 |
| May 27, 1939 | 3,585,250 | [3]3,412,000 | [4]277,038,000 | 84,845,000 | 27,553,000 | 110,855,000 |
| Change in past year | +6.9% | +4.9% | —6.9% | +18.2% | +2.9% | —6.5% |

[1] All time peak. [2] Peak for 1939. [3] Lowest since April, 1922. [4] Stocks, May 20, 1939. [5] Peak prior to 1939. [6] Lowest for year. [7] Prior to April 29, 1939, data did not include stocks at terminals, in transit, etc., except in California. [8] May, 1939, daily average. [9] Lowest since October, 1922, due to the shutdown of six Mid-Continent States.

# United States Crude Oil Production

**Estimates Compiled by THE OIL WEEKLY**

| DISTRICT OR STATE | Bureau of Mines Estimate of Daily Demand in May | State Allowable in May | BARRELS DAILY FOR WEEK ENDED June 1 | BARRELS DAILY FOR WEEK ENDED May 25 |
|---|---|---|---|---|
| **TEXAS—** | | | | |
| Texas Panhandle | ..... | ..... | 67,600 | 72,800 |
| North Texas | ..... | ..... | 104,500 | 111,100 |
| West Central Texas | ..... | ..... | 32,500 | 34,500 |
| West Texas | ..... | ..... | 237,200 | 264,400 |
| East Central Texas | ..... | ..... | 78,800 | 88,600 |
| East Texas Field | ..... | ..... | 396,700 | 396,700 |
| South Texas | ..... | ..... | 220,400 | 248,300 |
| Texas Gulf Coast | ..... | ..... | 229,300 | 249,800 |
| **Total Texas** | 1,344,200 | 1,420,500* | 1,367,000 | 1,466,200 |
| **CALIFORNIA—** | | | | |
| Long Beach | ..... | ..... | 42,500 | 43,700 |
| Midway-Sunset | ..... | ..... | 45,900 | 47,400 |
| Kettleman Hills | ..... | ..... | 46,200 | 49,600 |
| Wilmington | ..... | ..... | 84,400 | 81,900 |
| Others | ..... | ..... | 385,600 | 386,900 |
| **Total California** | 592,600 | 592,000† | 604,600 | 609,500 |
| **OKLAHOMA—** | | | | |
| Oklahoma City | ..... | ..... | 97,850 | 99,600 |
| Seminole Area | ..... | ..... | 103,350 | 105,200 |
| Others | ..... | ..... | 217,050 | 218,675 |
| **Total Oklahoma** | 408,100 | 408,100 | 418,250 | 423,475 |
| **ILLINOIS—** | | | | |
| Salem | ..... | ..... | 239,400 | 247,100 |
| Louden | ..... | ..... | 76,100 | 75,400 |
| Other New Pools | ..... | ..... | 110,050 | 103,500 |
| Old Pools | ..... | ..... | 9,750 | 8,900 |
| **Total Illinois** | 392,900 | ..... | 435,300 | 434,900 |

| DISTRICT OR STATE | Bureau of Mines Estimate of Daily Demand in May | State Allowable in May | BARRELS DAILY FOR WEEK ENDED June 1 | BARRELS DAILY FOR WEEK ENDED May 25 |
|---|---|---|---|---|
| **LOUISIANA—** | | | | |
| North Louisiana | ..... | ..... | 70,100 | 70,900 |
| South Louisiana | ..... | ..... | 238,200 | 233,200 |
| **Total Louisiana** | 264,500 | 293,080 | 308,300 | 304,100 |
| **KANSAS** | 158,100 | 158,100 | 158,850 | 160,500 |
| **NEW MEXICO** | 103,900 | 107,000 | 107,100 | 107,100 |
| **EASTERN STATES—** | | | | |
| Pennsylvania Grade | 52,100 | ..... | 76,100 | 77,800 |
| Others, Eastern | 49,200 | ..... | 19,500 | 20,700 |
| **Total Eastern States** | 101,300 | ..... | 95,600 | 98,500 |
| **MOUNTAIN STATES—** | | | | |
| Wyoming | 72,900 | ..... | 68,500 | 72,400 |
| Montana | 17,400 | ..... | 17,500 | 17,300 |
| Colorado | 3,500 | ..... | 3,300 | 3,400 |
| **Total Mountain States** | 93,800 | ..... | 89,300 | 93,100 |
| **MICHIGAN** | 63,200 | 58,000 | 59,500 | 61,200 |
| **ARKANSAS** | 64,500 | 70,000 | 71,500 | 71,300 |
| **INDIANA** | 8,100 | ..... | 12,800 | 10,700 |
| **MISSISSIPPI** | 5,800 | ..... | 9,350 | 8,750 |
| **NEBRASKA** | ..... | ..... | 150 | 100 |
| **‡Total 8 Prorated States** | 2,999,100 | 3,106,780 | 3,095,100 | 3,203,175 |
| **Total United States** | 3,601,000 | ..... | 3,737,600 | 3,849,425 |

* Net daily average, considering general shutdown May 1, and 14 shutdown days in East Texas Field.
† Recommendation of Central Committee of California Oil Producers.
‡ Texas, California, Oklahoma, Louisiana, Kansas, Arkansas, Michigan, New Mexico.

tion. Those units still operating are in most instances producers of crude as well as refiners, or are under contractual obligations which will keep them actively in the field for a time.

Until recently, independent marketers have been shading major company gasoline price postings from 3 to 5 cents a gallon on similar grades of fuel. This type of competition has given the independent operators an increasing share of the total market, while many of the larger companies have failed to retain their previous gallonage, instead of participating in the increasing level of total demand over the Pacific Coast territory.

Immediately upon the heels of Standard's cut in gasoline prices, Governor Olson of California voiced public protest over alleged drainage of state-owned oil lands along the California coast and ordered all operating companies on such lands to disregard in the future any semblance of compliance with the state's voluntary curtailment program. The governor's action came as a complete surprise, as data on curtailment compliance of such companies showed them as already producing more than their neighbors. During April, operators on state-owned lands at Huntington Beach field, for example, overproduced an average of nearly 3600 barrels daily, as compared with but 700 barrels daily by operators on private property in the area.

In the oil industry, inference was drawn from reference made by the governor to defeat of the Atkinson oil-control bill in California last November, that resentment is still harbored against those elements in the industry who preferred to continue under voluntary proration and keep the matter of curtailment of crude out of politics.

Disregarding the recent reduction in California crude oil prices, the new cut in posted prices for gasoline will have the effect of reducing gross revenues of West Coast companies by more than 11 percent. It is expected that this reduction in revenues will apply directly against profits, since compensating reductions cannot be made in selling-costs in like proportion.

The announcement issued by Standard Oil Company on the new price schedules was as follows:

"The Standard Oil Company of California announces, effective at the opening of business on May 28, reductions in the price of Standard gasoline of 1½ cents per gallon; Standard Ethyl 2½ cents per gallon; and Flight (3rd grade) 2 cents per gallon. These reductions are made for the purpose of meeting competition.

"The reductions will be effective throughout California, Oregon, Washington, Nevada, Arizona, the Hawaiian Islands and Alaska, except in certain portions of Eastern Washington, Oregon, Nevada and Arizona where the reductions in the various grades of gasoline will take into consideration reductions which have previously been made to meet competition."

## *Repressuring at Joe's Lake*

Republic Production Company and Houston Oil Company have been granted a permit to conduct repressuring operations in the Joe's Lake field, Tyler and Jasper counties. Allowables now assigned to wells which are to be used for input purposes will be distributed among other wells on the leases.

## *Production Down Sharply As Texas Shuts Down*

United States crude oil production declined sharply in the week ended June 1, in reflection of a monthly one-day shutdown of all Texas fields, the nation's output having averaged 3,737,600 barrels daily, or 111,825 barrels a day less than in the previous week.

The new production rate was, however, 136,600 barrels a day above indicated average daily market demand for domestic crude in May and over 100,000 barrels a day above the similar market requirements for June. For the Bureau of Mines estimated demand at 3,601,000 barrels daily in May and at 3,620,300 barrels a day in June.

The large decrease in the national output of crude in the week ended June 1 was accounted for largely by a decline of almost exactly 100,000 barrels in Texas. That state averaged 1,367,000 barrels daily, compared with 1,466,200 barrels a day the week before, and output was not far above indicated market demand.

California registered a 5000-barrel decrease in averaging 604,600 barrels daily, and was fairly close to indicated market demand and the state allowable.

Oklahoma production also came down approximately 5000 barrels, having averaged 418,250 barrels daily, which was about 10,000 barrels more than indicated daily demand.

Illinois output rose 400 barrels to 435,300 daily and was more than 40,000 barrels in excess of market demand.

# CALIFORNIA CRUDE OIL PRICES

**Posted effective February 1, 1940. All gravities above those quoted take highest price offered in that field.**

| Gravity | Wilmington | Signal Hill (Long Beach), El Segundo | Seal Beach | Huntington Beach | Inglewood | Playa del Rey | Olinda, Brea, Canon | Athens-Rosecrans | Elwood Terrace | Torrance | Richfield | Whittier, East Coyote (La Habra) | Montebello | West Coyote Hills | Santa Fe Springs | Newhall, McKittrick, Kern River, Round Mt., Kern Front | Greeley, Canal | Coles Levee, Richfield Western | Mountain View | Elk Hills, Buena Vista Hills, Midway-Sunset, Lakeview Area | Lost Hills | Coalinga | Wheeler Ridge | Kettleman Hills |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14-14.9 | $0.60 | $0.65 | $0.64 | $0.63 | $0.64 | $0.65 | $0.61 | .... | .... | $0.65 | $0.61 | $0.61 | $0.62 | $0.63 | .... | $0.60 | .... | .... | .... | $0.60 | $0.60 | $0.60 | .... | .... |
| 15-15.9 | .60 | .65 | .64 | .63 | .64 | .65 | .61 | .... | .... | .65 | .61 | .61 | .62 | .63 | .... | .60 | .... | .... | .... | .60 | .60 | .60 | .... | .... |
| 16-16.9 | .60 | .65 | .64 | .63 | .64 | .65 | .61 | .... | .... | .65 | .61 | .61 | .62 | .63 | .... | .60 | .... | .... | .... | .60 | .60 | .60 | .... | .... |
| 17-17.9 | .62 | .65 | .64 | .63 | .68 | .65 | .61 | .... | .... | .65 | .61 | .61 | .62 | .63 | .... | .60 | .... | .... | .... | .60 | .60 | .60 | .... | .... |
| 18-18.9 | .64 | .65 | .64 | .63 | .71 | .65 | .65 | .... | .... | .68 | .61 | .61 | .62 | .63 | .... | .60 | .... | .... | .... | .60 | .60 | .60 | .... | .... |
| 19-19.9 | .69 | .69 | .64 | .67 | .75 | .70 | .69 | .... | .... | .72 | .61 | .65 | .62 | .63 | .... | .60 | .... | .... | $0.60 | .64 | .64 | .61 | $0.60 | .... |
| 20-20.9 | .73 | .73 | .64 | .72 | .79 | .76 | .74 | .... | .... | .75 | .65 | .69 | .62 | .67 | .... | .... | .... | .... | .60 | .69 | .69 | .62 | .60 | .... |
| 21-21.9 | .78 | .78 | .64 | .76 | .82 | .81 | .78 | .... | .... | .79 | .69 | .73 | .62 | .72 | $0.63 | .... | .... | .... | .64 | .74 | .74 | .66 | .60 | .... |
| 22-22.9 | .82 | .82 | .69 | .81 | .86 | .85 | .82 | .... | .... | .82 | .73 | .77 | .66 | .76 | .63 | .... | .... | .... | .68 | .79 | .78 | .70 | .63 | .... |
| 23-23.9 | .86 | .86 | .75 | .85 | .89 | .92 | .86 | $0.71 | .... | .86 | .78 | .82 | .71 | .81 | .67 | .... | .... | .... | .71 | .84 | .82 | .74 | .67 | .... |
| 24-24.9 | .90 | .90 | .80 | .90 | .93 | .97 | .90 | .77 | .... | .89 | .82 | .86 | .75 | .85 | .72 | .... | .... | .... | .75 | .89 | .86 | .78 | .71 | .... |
| 25-25.9 | .95 | .95 | .86 | .94 | .96 | 1.02 | .95 | .82 | .... | .93 | .86 | .90 | .80 | .89 | .77 | .... | .... | .... | .79 | .94 | .90 | .82 | .75 | .... |
| 26-26.9 | .99 | .99 | .91 | .99 | 1.00 | 1.08 | .99 | .88 | .... | .96 | .90 | .94 | .84 | .94 | .82 | .... | .... | .... | .83 | .99 | .95 | .... | .... | .... |
| 27-27.9 | 1.03 | 1.03 | .97 | 1.03 | 1.04 | F.O.B. | 1.03 | .94 | .... | 1.00 | .94 | .98 | .89 | .98 | .87 | .... | $0.83 | $0.92 | .87 | 1.04 | .99 | .... | .... | .... |
| 28-28.9 | 1.07 | 1.07 | 1.02 | 1.07 | 1.07 | Pipe Line | 1.07 | .99 | .... | 1.03 | .98 | .... | .93 | 1.02 | .91 | .... | .86 | .96 | .91 | 1.09 | 1.03 | .... | .... | .... |
| 29-29.9 | 1.10 | 1.10 | 1.07 | 1.11 | 1.10 | .... | 1.10 | 1.04 | .... | 1.06 | 1.02 | .... | .98 | 1.06 | .96 | .... | .90 | .99 | .95 | 1.14 | 1.07 | .... | .... | .... |
| 30-30.9 | 1.14 | 1.14 | 1.12 | 1.15 | 1.14 | .... | 1.14 | 1.09 | F.O.B. | 1.09 | .... | .... | 1.02 | 1.10 | 1.01 | .... | .94 | 1.02 | .99 | 1.19 | 1.11 | .... | .... | .... |
| 31-31.9 | .... | .... | .... | .... | 1.17 | .... | 1.17 | 1.14 | Ship | .... | .... | .... | 1.07 | 1.14 | 1.05 | .... | .98 | 1.06 | 1.02 | 1.24 | .... | .... | .... | .... |
| 32-32.9 | .... | .... | .... | .... | 1.20 | .... | 1.20 | 1.19 | | .... | .... | .... | 1.11 | 1.18 | 1.09 | .... | 1.02 | 1.09 | 1.06 | 1.29 | .... | .... | .... | .... |
| 33-33.9 | .... | .... | .... | .... | .... | .... | .... | 1.24 | $1.21 | .... | .... | .... | 1.15 | 1.22 | 1.14 | .... | 1.06 | 1.13 | 1.10 | 1.34 | .... | .... | .... | $1.12 |
| 34-34.9 | .... | .... | .... | .... | .... | .... | .... | 1.29 | 1.25 | .... | .... | .... | 1.20 | 1.26 | 1.19 | .... | 1.10 | 1.16 | 1.14 | .... | .... | .... | .... | 1.17 |
| 35-35.9 | .... | .... | .... | .... | .... | .... | .... | 1.34 | 1.29 | .... | .... | .... | 1.24 | .... | 1.23 | .... | 1.14 | 1.20 | .... | .... | .... | .... | .... | 1.21 |
| 36-36.9 | .... | .... | .... | .... | .... | .... | .... | 1.39 | 1.33 | .... | .... | .... | 1.28 | .... | 1.27 | .... | 1.18 | 1.23 | .... | .... | .... | .... | .... | 1.25 |
| 37-37.9 | .... | .... | .... | .... | .... | .... | .... | 1.44 | 1.37 | .... | .... | .... | 1.33 | .... | 1.31 | .... | 1.22 | 1.26 | .... | .... | .... | .... | .... | 1.29 |
| 38-38.9 | .... | .... | .... | .... | .... | .... | .... | 1.49 | .... | .... | .... | .... | 1.37 | .... | 1.36 | .... | 1.25 | 1.30 | .... | .... | .... | .... | .... | 1.33 |
| 39-39.9 | .... | .... | .... | .... | .... | .... | .... | 1.54 | .... | .... | .... | .... | 1.42 | .... | .... | .... | 1.29 | 1.34 | .... | .... | .... | .... | .... | 1.38 |
| 40-40.9 | .... | .... | .... | .... | .... | .... | .... | 1.59 | .... | .... | .... | .... | 1.46 | .... | .... | .... | 1.33 | 1.37 | .... | .... | .... | .... | .... | .... |
| 41-41.9 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 1.50 | .... | .... | .... | 1.37 | 1.40 | .... | .... | .... | .... | .... | .... |
| 42-42.9 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 1.54 | .... | .... | .... | 1.41 | 1.44 | .... | .... | .... | .... | .... | .... |
| 43-43.9 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 1.59 | .... | .... | .... | 1.45 | 1.47 | .... | .... | .... | .... | .... | .... |
| 44-44.9 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 1.63 | .... | .... | .... | 1.49 | 1.51 | .... | .... | .... | .... | .... | .... |
| 45-45.9 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 1.67 | .... | .... | .... | 1.53 | 1.54 | .... | .... | .... | .... | .... | .... |
| 46-46.9 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 1.71 | .... | .... | .... | 1.57 | 1.57 | .... | .... | .... | .... | .... | .... |
| 47-47.9 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 1.61 | .... | .... | .... | .... | .... | .... | .... |
| 48-48.9 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 1.64 | .... | .... | .... | .... | .... | .... | .... |

# CRUDE OIL PRICE SCHEDULES

## MID-CONTINENT GRAVITY SCALE PRICES—Posted October 11-13, 1938

(Some fields of Mid-Continent have flat price postings, and are shown separately)

| Gravity | [7]Okla.-Kans. | [10] North La.-Ark. | [9] Schuler, Ark. 9-13-39 | North & W. Central Tex. | East Central Tex. | Gray Co. Tex. | Carson, Hutchinson Co. Tex. | [1]Tomball Tex. Type | West Tex.-New Mex. | [2]Gulf Coast (Tex.-La.) 10-2-39 | [3]Some La. Gulf Areas 10-2-39 | Jennings, La. | [4]Anahuac, Tex. Type 10-2-39 | [5]Refugio, Tex. Type 10-2-39 | [6]Mirando, Tex. Type 10-2-39 | [8]Salt Creek, Wyo. (except Tensleep) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 19–19.9.. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | *$0.53 | *$0.86 | *$0.86 | ..... | *$0.81 | *$0.91 | *$0.86 | ..... |
| 20–20.9.. | $0.60 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | .55 | .88 | .88 | ..... | .83 | .93 | .88 | $0.70 |
| 21–21.9.. | .63 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | .57 | .90 | .90 | ..... | .85 | .95 | .90 | .72 |
| 22–22.9.. | .66 | ..... | ..... | ..... | ..... | ..... | ..... | *$0.95 | .59 | .92 | .92 | ..... | .87 | .97 | .92 | .74 |
| 23–23.9.. | .69 | ..... | ..... | ..... | *$0.78 | ..... | ..... | .97 | .61 | .94 | .94 | ..... | .89 | .99 | .94 | .76 |
| 24–24.9.. | .72 | *$0.73 | *$0.63 | *$0.71 | .80 | ..... | ..... | .99 | .63 | .96 | .96 | ..... | .91 | 1.01 | .96 | .78 |
| 25–25.9.. | .75 | .75 | .65 | .73 | .82 | ..... | ..... | 1.01 | .65 | .98 | .98 | ..... | .93 | 1.03 | .98 | .80 |
| 26–26.9.. | .78 | .77 | .67 | .75 | .84 | ..... | ..... | 1.03 | .67 | 1.00 | 1.00 | ..... | .95 | 1.05 | 1.00 | .82 |
| 27–27.9.. | .81 | .79 | .69 | .77 | .86 | ..... | ..... | 1.05 | .69 | 1.02 | 1.02 | ..... | .97 | 1.07 | 1.02 | .84 |
| 28–28.9.. | .84 | .81 | .71 | .79 | .88 | *$0.72 | *$0.67 | 1.07 | .71 | 1.04 | 1.04 | ..... | .99 | 1.09 | 1.04 | .86 |
| 29–29.9.. | .87 | .83 | .73 | .81 | .90 | .74 | .69 | 1.09 | .73 | 1.06 | 1.06 | ..... | 1.01 | 1.11 | 1.06 | .88 |
| 30–30.9.. | .90 | .85 | .75 | .83 | .92 | .76 | .71 | 1.11 | .75 | 1.08 | 1.08 | ..... | 1.03 | 1.13 | 1.08 | .90 |
| 31–31.9.. | .92 | .87 | .77 | .85 | .94 | .78 | .73 | 1.13 | .77 | 1.10 | 1.10 | *$0.87 | 1.05 | 1.15 | 1.10 | .92 |
| 32–32.9.. | .94 | .89 | .79 | .87 | .96 | .80 | .75 | 1.15 | .79 | 1.12 | 1.12 | .89 | 1.07 | 1.17 | 1.12 | .94 |
| 33–33.9.. | .96 | .91 | .81 | .89 | .98 | .82 | .77 | 1.17 | .81 | 1.14 | 1.14 | .91 | 1.09 | 1.19 | 1.14 | .96 |
| 34–34.9.. | .98 | .93 | .83 | .91 | 1.00 | .84 | .79 | 1.19 | .83 | 1.16 | †1.16 | .93 | 1.11 | 1.21 | 1.16 | .98 |
| 35–35.9.. | 1.00 | .95 | .85 | .93 | 1.02 | .86 | .81 | 1.21 | .85 | 1.18 | ..... | .95 | 1.13 | 1.23 | 1.18 | 1.00 |
| 36–36.9.. | 1.02 | .97 | .87 | .95 | 1.04 | .88 | .83 | 1.23 | .87 | 1.20 | ..... | .97 | 1.15 | 1.25 | 1.20 | 1.02 |
| 37–37.9.. | 1.04 | .99 | .89 | .97 | 1.06 | .90 | .85 | 1.25 | .89 | 1.22 | ..... | .99 | 1.17 | 1.27 | 1.22 | 1.04 |
| 38–38.9.. | 1.06 | 1.01 | .91 | .99 | 1.08 | .92 | .87 | 1.27 | .91 | 1.24 | ..... | 1.01 | 1.19 | 1.29 | 1.24 | 1.06 |
| 39–39.9.. | 1.08 | 1.03 | .93 | 1.01 | 1.10 | .94 | .89 | 1.29 | .93 | 1.26 | ..... | 1.03 | 1.21 | 1.31 | 1.26 | 1.08 |
| 40+..... | 1.10 | 1.05 | .95 | 1.03 | 1.12 | .96 | .91 | 1.31 | .95 | 1.28 | ..... | 1.05 | 1.23 | 1.33 | 1.28 | 1.10 |

* Minimum price and applies also to purchases of lower gravity.

† Maximum price and applies also to purchases of higher gravity.

[1] Tomball, Raccoon Bend (Deep) and Satsuma.

[2] Includes Amelia, Barbers Hill, Big Creek, Blue Ridge, Clear Lake, Cotton Lake, Esperson, Fannett, Goose Creek, Hankamer, Lovells Lake, Lochridge, Moore, Mykawa, Nome, Orange, South Liberty, Spindle Top, Sugar Land, Thompsons, Webster, and West Beaumont.

[3] Includes Berwick Bay, Bay St. Elaine, Caillou Island, Chacahoula, Dog Lake, Edgerly, Four Isle, Gillis, Grand Bay, Hackberry, Horseshoe Bayou, Iberia, Jefferson Island, Lake Barre, Lake Pelto, Leesville, Port Barre, Starks, Timballier Bay, Quarantine Bay, and Vinton fields.

[4] Anahuac, Dickinson, Gillock, Cedar Point, Fairbanks, Turtle Bay, Hull, Orange, Pierce Junction, Batson, Caplen, Humble, North Dayton, Saratoga, Sour Lake, South Esperson, Spindle Top, West Orange, Thompson (deep), and Raccoon Bend (shallow) fields.

[5] Includes Saxet, E. White Point, Greta, O'Connor-McFadden, Taft, Plymouth and Tom O'Connor fields.

[6] Includes Duval, Jim Hogg, Webb and Zapata counties, Texas, and Heyser and Placedo fields.

[7] Oklahoma Pipe Line and Magnolia schedules.

[8] Includes La Barge, Midway Dome, Dutton.

[9] Also Buckner, Village, Magnolia.

[10] Add 10 cents for Bunkie and Eola field prices.

## Mid-Continent Flat Prices

| | Flat Price | Date Posted |
|---|---|---|
| **Arkansas:** | | |
| Smackover | $0.73 | 10–12–38 |
| **Louisiana:** | | |
| Garden Island | 1.24 | 10–12–38 |
| Gibson | 1.04 | 10–11–38 |
| Lafitte | 1.04 | 10–12–38 |
| **Texas:** | | |
| Cayuga | .78 | 10– 2–39 |
| East Texas | 1.10 | 10–12–38 |
| Talco | .65 | 10– 2–39 |
| Livingston, Cleveland | 1.10 | 10–12–38 |
| Van | .93 | 10–12–38 |
| Pettus | 1.29 | 10–12–38 |
| Pecos County | .78 | 10–12–38 |
| Pecos Shallow | .65 | 10–12–38 |
| Luling | .87 | 10–12–38 |
| Lytton Springs | .99 | 10–12–38 |
| Salt Flat, Darst Creek, Hilbig, Carroll, Clark and Zoboroski | .96 | 10–11–38 |
| Flour Bluff-Jim Wells Co. | 1.23 | 10–11–38 |
| Guerra | 1.06½ | 5– 8–39 |
| Seabreeze, Willow Slough, La Belle, Hardin, S. China | 1.10 | 9–14–39 |
| Clay Creek | .85 | 10–13–38 |
| Conroe | 1.27 | 10–11–38 |
| Long Lake | 1.08 | 10–19–38 |

## Middle West Prices

| | | |
|---|---|---|
| Lima, Ohio | $0.90 | 10–13–38 |
| Illinois, old fields | .95 | 6– 8–39 |
| Illinois Basin | 1.05 | 6– 8–39 |
| Lake Centralia-Salem, Illinois | 1.05 | 10–21–39 |
| Princeton, Indiana | .95 | 6– 8–39 |
| Sw. Ind.-Se. Ill.: N. Griffin, S. Griffin, Phillipstown, New Harmony, and Iron | 1.00 | 5–25–40 |
| Western Kentucky | .90 | 6– 8–39 |
| Birk City, Western Kentucky | .90 | 6– 8–39 |
| Kentucky River, Eastern Ky. | 1.10 | 6– 9–39 |
| Big Sandy River, Eastern Ky. | 1.02 | 6– 9–39 |

## Michigan Prices

| | Flat Price | Date Posted |
|---|---|---|
| **Central (Basin):** | | |
| Porter, Greendale, Crystal, Wise, Midland | $1.02 | 10– 9–39 |
| Buckeye, Edenville, Bentley, Beaverton | 1.00 | 10– 9–39 |
| Freeman, Sherman, Clare | .97 | 10– 9–39 |
| Arenac, Ogemaw, W. Branch | .87 | 11– 9–39 |
| **Southwest (Shallow):** | | |
| Allegan, Kent Counties | 1.03 | 10– 9–39 |
| Van Buren Co., Bloomingdale | 1.03 | 11– 9–39 |
| Zeeland | .85 | 10– 9–39 |
| Bangor | .83 | 10– 9–39 |

## Rocky Mountain States Prices

| | | |
|---|---|---|
| **Colorado:** | | |
| Canon City, Ft. Collins, Wellington, Moffat and Florence | .90 | 10–11–38 |
| Iles, Light | .98 | 10–11–38 |
| Iles, Heavy | .92 | 10–11–38 |
| **Montana:** | | |
| Cat Creek | 1.10 | 10–11–38 |
| Cut Bank | 1.00 | 1– 1–40 |
| Sunburst | .90 | 11–16–37 |
| **New Mexico:** | | |
| Artesia | .77 | 10–11–38 |
| Hogback | 1.00 | 10–11–38 |
| **Wyoming:** | | |
| Big Muddy | .98 | 10–11–38 |
| Byron | .55 | 10–11–38 |
| Dry Creek | .92 | 10–11–38 |
| Elk Basin | .90 | 10–11–38 |
| Frannie, Light | .55 | 10–11–38 |
| Frannie, Heavy | .42 | 10–11–38 |
| Garland | .50 | 10–11–38 |
| Grass Creek, Light | .90 | 10–11–38 |
| Grass Creek, Heavy | .40 | 10–11–38 |
| Hamilton Dome | .35 | 10–11–38 |
| Lance Creek | .77 | 10–11–38 |
| Mill Creek | .72 | 10–11–38 |
| Oregon Basin | .40 | 4–20–40 |
| Osage | 1.30 | 10–11–38 |
| Poison Spider | .59 | 10–11–38 |
| Rock Creek | 1.00 | 10–11–38 |
| Tensleep | .646 | 10–11–38 |

## Pennsylvania Prices

| | Flat Price | Date Posted |
|---|---|---|
| Bradford-Allegany | $2.50 | 5–22–40 |
| National Transit Lines | 2.50 | 5–22–40 |
| Sw. Pa. Pipe Line | 2.15 | 5–22–40 |
| Eureka Pipe Line | 2.09 | 5–22–40 |
| Corning Grade, Ohio | 1.12 | 11– 4–39 |

## Major Price Changes

| | Penna. (Nat. Tr.) | Mid-Cont. (36 Gr.) | Calif. (26 Gr.) |
|---|---|---|---|
| June 19, 1933 | Up 10 | Up 19 | ..... |
| June 26, 1933 | Up 10 | ..... | Up 9-12 |
| July 6, 1933 | Up 13 | Up 10 | ..... |
| July 17, 1933 | Up 15 | ..... | ..... |
| July 28, 1933 | Up 15 | ..... | ..... |
| Aug. 11, 1933 | Up 10 | ..... | ..... |
| Aug. 24, 1933 | ..... | Up 10 | ..... |
| Aug. 30, 1933 | Up 15 | ..... | ..... |
| Sept. 6, 1933 | Up 10 | Up 10 | Up 15 |
| Sept. 8, 1933 | ..... | Up 15 | ..... |
| May 1, 1934 | Up 10 | ..... | ..... |
| Nov. 6, 1934 | Cut 25 | ..... | ..... |
| Dec. 6, 1934 | Cut 25 | ..... | ..... |
| Jan. 4, 1935 | Up 15 | ..... | ..... |
| Feb. 4, 1935 | Up 15 | ..... | ..... |
| May 16, 1935 | Cut 15 | ..... | ..... |
| June 26, 1935 | Cut 15 | ..... | ..... |
| July 16, 1935 | Cut 10 | ..... | ..... |
| Aug. 29, 1935 | ..... | ..... | Cut *1 |
| Sept. 6, 1935 | Up 5 | ..... | ..... |
| Oct. 29, 1935 | Up 15 | ..... | ..... |
| Nov. 1, 1935 | ..... | ..... | Up *28 |
| Nov. 18, 1935 | Up 15 | ..... | ..... |
| Dec. 6, 1935 | ..... | ..... | Up *9 |
| Jan. 9, 1936 | ..... | Up 10 | ..... |
| Jan. 13, 1936 | Up 15 | ..... | ..... |
| Mar. 7, 1936 | ..... | ..... | Up *18 |
| Dec. 28, 1936 | Up 12 | ..... | ..... |
| Jan. 28, 1937 | ..... | Up 12 | ..... |
| Feb. 24, 1937 | Up 10 | ..... | ..... |
| June 7, 1937 | Up 15 | ..... | ..... |
| Sept. 1, 1937 | Cut 22 | ..... | ..... |
| Oct. 12, 1937 | Cut 25 | ..... | ..... |
| Dec. 1, 1937 | Cut 15 | ..... | ..... |
| March 7, 1938 | Cut 17 | ..... | ..... |
| June 13, 1938 | Cut 25 | ..... | ..... |
| Sept. 1, 1938 | Cut 12 | ..... | ..... |
| Oct. 11, 1938 | ..... | Cut 20 | ..... |
| Jan. 21, 1939 | Up 12 | ..... | ..... |
| Feb. 2, 1939 | Up 8 | ..... | ..... |
| March 6, 1939 | Up 12 | ..... | ..... |
| Oct. 6, 1939 | Up 25 | ..... | ..... |
| Nov. 1, 1939 | Up 15 | ..... | ..... |
| Dec. 1, 1939 | Up 10 | ..... | ..... |
| Jan. 1, 1940 | Up 25 | ..... | ..... |
| Feb. 1, 1940 | ..... | ..... | Cut *7 |
| May 22, 1940 | Cut 25 | ..... | ..... |

* Signal Hill 26 gravity.

## Crude Production Taxes

Oklahoma—Five percent of gross value less royalty interests.
Texas—2¾ cents or 2¾ percent, whichever is higher.
Louisiana—From four to 11 cents a barrel, depending upon gravity.
Arkansas—2.6 percent of gross market value.
Montana—Two percent of gross value at well and ⅝ of 1c per barrel.
New Mexico—Severance tax of 2 percent on oil and gas.
Wyoming and New Mexico—Production tax based upon state and county assessments.
California—.66443 mills per barrel of oil produced and 17.39 cents an acre on proved lands.

# WORLD-WIDE DEVELOPMENTS

By WM. V. GROSS, Associate Editor

## Colombia

### *Tropical Oil Completes Eight Wells on La Cira*

Tropical Oil Company completed 8 wells on the La Cira structure in April, and had 5 tests drilling.

Production from La Cira and Infantas fields was 1,449,455 and 340,129 barrels, respectively, or a total of 1,789,584 barrels. Footage drilled totaled 19,338. The Barrancabermeja refinery processed 227,450 barrels of crude.

### *Gulf Moves 392,692 Barrels From La Petrolea in April*

South American Gulf Oil Company transported 392,692 barrels of oil from La Petrolea field to Covenas during April, or approximately half of the company's pipe-line capacity.

During the same period, Andian National Corporation transported 1,538,284 barrels to marine terminal, including 19,397 barrels of natural gasoline mixed with the oil.

### *Manotas Heads New Ministry of Petroleum*

Colombian petroleum developments during May were highlighted with creation by presidential decree of that country's first Ministry of Mines and Petroleum, ranking directly under the Ministry of National Economy.

President Santo created the new ministry because of "grave problems of economic character arising from the warfare in Europe. He called for a vast plan of national defense and bolstering up of industry, development of new sources of production, and generally more thorough utilization of Colombia's natural resources.

Dr. Juan Pablo Manotas, former bank superintendent at Bogota and currently a distinguished product of the law school in the National University in Bogota, has been given the honor of being the first minister of the Ministry of Petroleum and Mines. Dr. Manotas, twice governor of the Department of Atlantico, has practiced law in Barranquilla for a number of years.

Translation of the decree reveals that "the ministry will handle business pertaining to undisclosed national properties formerly in the care of the Ministry of Finance."

## Mexico

### *Orders Reorganization to Effect Financial Economies*

President Lazaro Cardenas of Mexico last week ordered a far-reaching reorganization of the oil industry to bring about economies urgently necessary to enable Mexico to meet financial obligations incurred by his expropriation decree.

Early in the year Cardenas had told Petroleos Mexicanos it must cut salaries and reduce personnel as an approach to putting the industry on a paying basis. Some of the points in his suggested program were violently objected to by the labor unions as well as some of the higher executives of Petromex.

Then, just prior to Mexico's recent answer to United States Secretary of State Cordell Hull's note, which continued to brand the expropriation as confiscation and stood firm on a demand that settlement of the compensation amounts be left to arbitration, the Mexican labor syndicates about-faced and indicated a willingness to back the president's platform for reorganization of the industry. Observers saw in the move an attempt at harmony in view of the coming presidential election. Labor has endorsed Comacho, the government's choice as successor to Cardenas, as opposed to Almazan, who is running on an independent ticket.

Cardenas' demand upon the Petroleum Workers Union to "support without reservation" his economy program is heralded in some quarters as a sign that he is growing weary of labor's interference in governmental and political activities. Moreover, notwithstanding glowing reports in the government press which infer that recent deals for the sale of Mexican oil will put the industry out of the red, so to speak, Cardenas' order to the union and to Petroleos Mexicanos to toe the mark may reflect personal knowledge that the deals made thus far offer no immediate alleviation to an unsatisfactory financial condition.

### *Seek to Eliminate Sinclair Properties From Evaluation*

President Cardenas last week instructed the Mexican attorney general to seek judicial approval for eliminating the former properties of Sinclair interests from evaluation of expropriated holdings now being made by government-appointed appraisers.

The court, meanwhile, advised appraisers that their evaluation of the former American, British and Netherlands holdings would have to be completed by June 7.

## Canada

### *Canadian Field Rated At 93,500 Barrels Daily*

Turner Valley, Canada's principal oil field, could produce 93,500 barrels daily through 1-inch choke, according to recent tests of well potentials.

The field is prorated to 18,000 barrels daily, corresponding to market demand. It numbers 103 oil wells, with nine operations expected to complete this month.

## East Indies

### *German Answer to Japan on Indies Lacks Encouragement*

So far as oil interests in Netherlands Indies are concerned, there was nothing encouraging in the recent German answer to Japan's querry on Germany's attitude toward the "status quo" problem in that part of the world.

Major General Eugene Ott, German ambassador to Japan, late in May informed Foreign Minister Hachiro Arita that the "German government is not interested in the Netherlands Indies problem."

The nationalistic press in Japan construed the German answer as giving Japan power of attorney, or as agreeing to any action that Japan might take. They construed it as strengthening the group that has been clamoring for positive measures to "protect" Japan's interest in the South Seas. According to that group, the "status quo" is something that requires immediate attention. Kokumin, main organ of the National "Southward Ho" party in Japan, argues that transfer of the Netherlands government to London already has effected the status quo in the Netherlands Indies, notwithstanding assurances that the Netherlands would maintain Japan's supplies, whatever happened.

Oil happens to be one of the most valuable assets of the Netherlands Indies. Japan long has coveted crude reserves of British, Dutch and American interests there, and all efforts of Japanese interests to obtain a substantial foothold among crude producers or refiners in the Indies have been failures.

Due to their proximity, oil fields of the Netherlands Indies would be preferred by Japan to those of any other part of the world.

Sir Robert Leslie Craigie, British ambassador to Japan, has declared that forces in the Netherlands Indies are sufficient to maintain order. He had in mind at time of the statement the fifth column activities of Germany. Whether the same would hold true with reference to similar tactics by Japan is problematical. In this connection some comfort is drawn from the fact that demands by a certain political group in Japan that the country ally herself with Germany, such demands dating back to the outbreak of hostilities in Europe, are not likely to be complied with as long as the incumbent Japanese cabinet remains in power.

Britain and France have gone on record with declarations that they will respect the status quo in the Indies. As to the United States, Secretary of State Cordell Hull has declared that "an alteration of the status quo in the Netherlands Indies by other than peaceful processes would be prejudicial to the stability, peace and security, not only of the region of the Netherlands Indies, but of the entire Pacific area."

# ALL SET FOR HOT SUMMER WEATHER . . .

TEXAS

CALIFORNIA

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It's a sure thing that the operators of these wells will not have to worry with engine failures due to hot weather. They know the summer season will not be a time of excessive repair bills and shut down wells.

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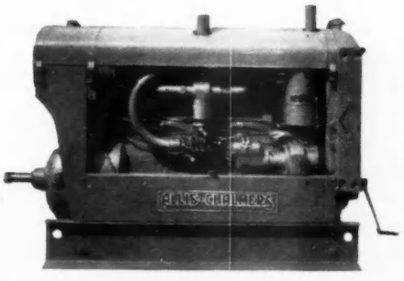
**Full pressure** lubrication from a gear-driven pump is maintained to all main bearings, connecting rod bearings, piston pins, valve rocker arms, and governor.

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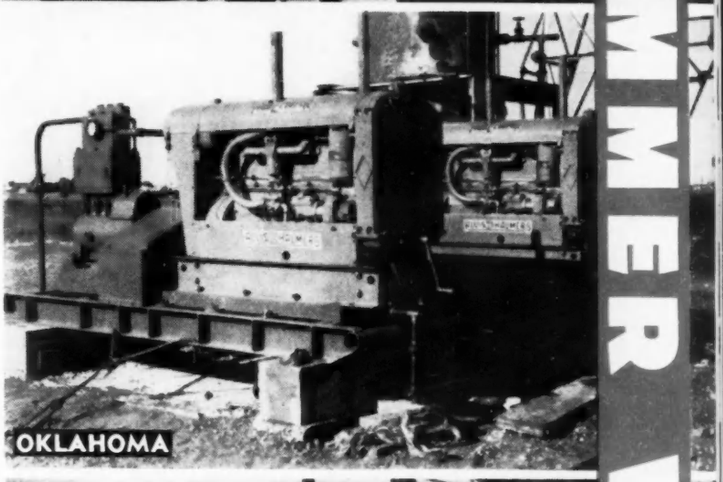
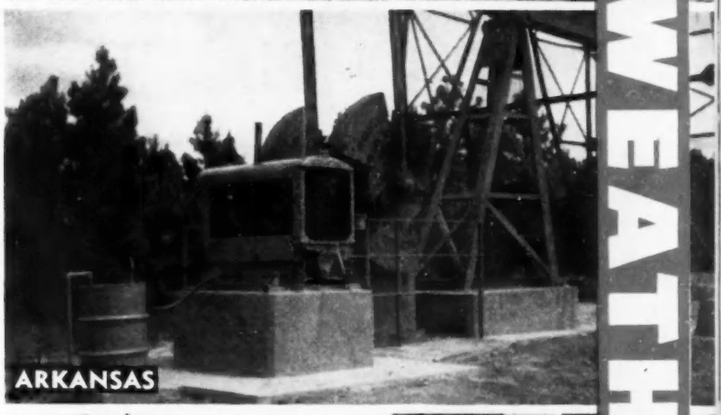
**Four cylinder. Bore 5¼". Stroke 6½". Continuous operating range 600 to 1200 r.p.m. Torque 375 ft. lbs. Fuel: natural gas, gasoline, distillate. Governor, centrifugal, variable speed.**


OKLAHOMA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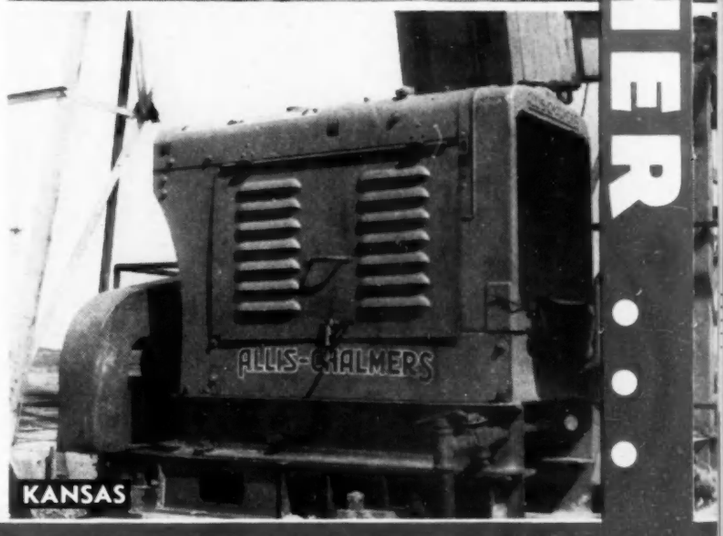

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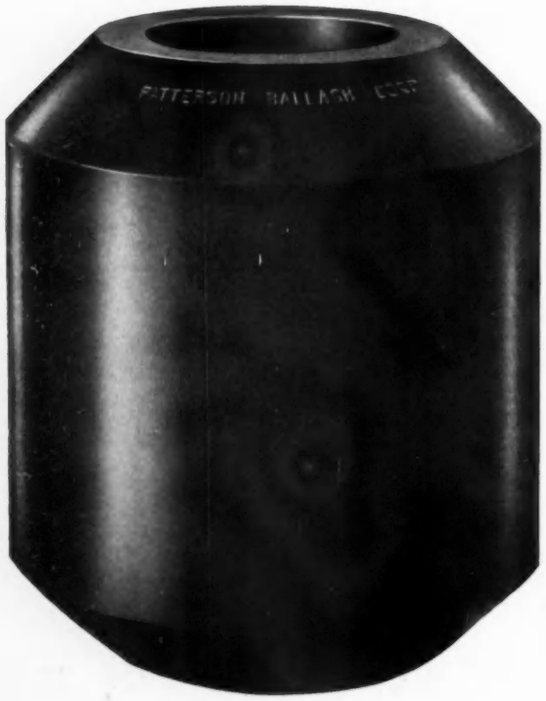
*Above photo shows P-B Stabilizers on drill pipe after service. They stay in place, even when worn down to tool joint size, as is indicated by the first two above, which served in several wells.*




**For the higher speeds of drilling, to defeat the destructive whip in the string and cut down friction, Patterson-Ballagh presents Stabilizers with unequalled qualities. Operators report savings of as much as 50% as shown on the Torque Gauge. Kinked joints are a thing of the past where this product is used. These Stabilizers are cured in a special new press designed exclusively for this purpose. It permits an even cure throughout so that the entire cross area has uniform toughness, even in the center. An extremely high degree of toughness is embodied. It will give longer service. If you are having drill pipe trouble, here's your solution.**

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# U. S. FIELD OPERATIONS

## Oklahoma

### *Seminole Wildcat Shows for Misener Sand Discovery*

A Misener-sand pool was indicated as F. B. Murta and Wilson's Harber 1, CW½ NE SE 4-10n-6e, 2 miles west of Keokuk pool, Seminole County, cored saturated sand at 4243-55 feet with a good show of oil and gas. Pipe will be run above the pay and plugs drilled to test the show.

In the same county, Winona Oil & Gas Company's Jackson 1, SW SE NE 18-7n-8e, ½ mile north of the Fish pool, topped first Wilcox sand at 4189 feet, and drilled into pay at 4192-95 feet. In 5 hours, the well flowed 150 barrels through open casing. Oil tested 38-gravity. Operators were running tubing to test with various chokes. Nine feet of Dolomite was cased off when the sand showed for production. The same company drilled a northwest diagonal offset which was dry. Several dry holes have been drilled between this well and the Fish pool, which has pays in both the Dolomite and Wilcox horizons. The company staked a south offset at Barkus 3, NW NE SE 18-7n-8e. One-half mile south of Jackson 1, Winona Oil & Gas Company and Jarvis-Holmes brought in a 240-barrel well at Barkus 1, while Barkus 2, a north offset, was abandoned at 3170 feet.

Two extension tests were completed in the Coyle pool, Payne County. Mid-Continent Petroleum Corporation's Johnson 1, CW½ SW SE 2-17n-1e, topped Wilcox sand at 4939 feet and drilled to 4965 feet. On a 24-hour test, it flowed 848 barrels natural without water. The Texas Company completed Minnich 3, CW½ NW NE 11-17n-1e, for 220 barrels daily. Wilcox sand was logged at 4899-4952 feet. The company located Vaughn 1, CE½ SW SW 2-17n-1e, a northwest diagonal offset to Minnich 3 and a direct west offset to Johnson 1.

#### Pottawatomie Wildcat Dry

Taber & Coleman et al's McKinney 1, CE½ SE SW 11-10n-4e, 3 miles east of Shawnee pool and 5 miles north of West King pool, Pottawatomie County, was dry in Wilcox at 5083-88 feet. Formations recorded were Oswego lime, 3730 feet; Earlsboro, 4115-30 feet; Brown lime, 4340 feet; Mississippi Camey, 4445 feet; Mayes 4580 feet; Woodford, 4718 feet; Hunton, 4750 feet; Sylvan, 4840 feet, and Viola, 4908 feet.

In Noble County, Helmerich & Payne's Lucy Fire Shaker 1, wildcat in SEc NE 11-24n-3e, topped Mississippi lime at 3590 feet, encountering a thick section by coming out of the lime below 3960 feet. Outlook was brightened somewhat as Viola lime was believed absent as the drill went into sandy dolomite, nearing the Wilcox sand, at 3970 feet. Helmerich & Payne and Blackwell Oil & Gas Company have a block of 3000 acres surrounding the well site, with inside holdings by L. H. Wentz and Wilcox Oil & Gas Company. Two dry holes have defined the structure on the south.

Midco Oil Corporation cored heavy saturation at Harbison 1, NWc SE SW 22-23n-2w, on the edge of the Billings pool, Noble County. Wilcox sand was logged at 4330-40 feet, and 7-inch casing cemented at 4320 feet.

Hall, Troup & Moore's Haskins 1, SWc 26-5n-4e, extended Bebee pool west after flowing 320 barrels of oil in 6½ hours. Viola lime, topped at 2475 feet, was drilled 25 feet. Hunton lime, at 2311 feet, was perforated with one shot. The well is awaiting a pipe-line outlet.

#### Oklahoma County Test

Continental Oil Company located Parker 1, SEc NE 24-14-4w, northwest of Edmond pool, Oklahoma County, on a 1200-acre block as a projected 6800-foot test. A dry hole was drilled 1¾ miles northeast to 6641 feet. Same operator's Chitwood 1, NEc SW 15-16n-4w, 3 miles south of Crescent pool, Logan County, was drilling below 6300 feet in shale and checking structurally low. Oswego lime was topped at 5767 feet. Kerlyn Oil Company et al's Cavanaugh 1, CW½ SW NW 1-15n-4w, near Navine, Logan County, was drilling below 5575 feet.

West of Dill pool, Seminole County, John Droppleman and Davis Drilling Company were rigging up tools at Keyes 1, NEc SE 4-11n-8e. An 1800-barrel Cromwell-sand producer was completed by the operators in Section 3.

Magnolia Petroleum Company's Fiekes 1, C SW SW 31-18n-14w, near Oakwoods, Dewey County, installed a blow-out preventer after experiencing heavy gas pressures at 9475 feet.

Devonian Oil Company's Scott 1-A, SEc NE 19-18n-5e, north of Broyles pool, Payne County, was drilling below 3965 feet in Viola lime without a show. Two miles west of Bebee pool, Pontotoc County, Patterson et al's Isaacs 1, SW NW NE 3-4n-4e, was abandoned in the second Wilcox at 3145-3230 feet. Hunton lime was absent and Viola lime, topped at 2690 feet, was dry. L. P. Sandback et al moved in rig at Stotler 1, NEc 26-5n-6e, 1 mile west of West Francis pool, Pontotoc County.

In Cotton County, one wildcat was dry while another was drilling. Selby Oil & Gas Company's Abbott 1, SWc NW 11-5s-12w, in the Randlett sector, was abandoned in Arbuckle lime at 3250-3480 feet. Canyon lime, topped at 2380 feet, failed to show. Scott's Masonic Home 1, NWc SW 13-4s-13w, a projected 2500-foot rotary test, was drilling below 750 feet.

Scrivner was drilling below 1100 feet at Plettner 1, NWc NE 36-3s-13e, Atoka County. Clyde Ross et al's Hardy 1, SEc NW 21-7s-15e, was temporarily abandoned at 1950 feet in sand. A small show of oil was logged at 1887 feet.

## Kansas

### *Semi-Wildcat Extends Stoltenberg Pool West*

Aylward Producing Company and Central Petroleum Company have extended the Stoltenberg pool, Ellsworth County, a mile west with Haska 1, CE½ SE SE 6-16-10w, a semi-wildcat. Arbuckle lime, logged at 3273½-90 feet, was treated with 1200 gallons of acid. It began making 2 barrels hourly. After re-acidizing with 2000 gallons through tubing, flow increased to 8 barrels hourly without water showing. Crude tested between 47- and 48-gravity. The well is estimated at better than 300 barrels daily when production tests have been completed.

Prunty Production Company et al moved the pool ¼-mile north when Skalicky 1, CWL NW NW 9-16-10w, filled 500 feet with oil in approximately 2 hours after drilling out plugs in Arbuckle lime at 3251-60 feet. Hole will be deepened and pay acidized.

Sharon Drilling Company and Atlantic Refining Company have apparently opened a new pool a mile southwest of Stoltenberg, or extended that pool, at Novotny 1, CN½ NW NE 32-16-10w. Arbuckle lime, topped at 3292 feet, was penetrated about 16 feet. A small nitro shot and acid is expected to make a small producing well. West of Stoltenberg pool, Russell Moore et al's Lille 1, CS½ SE NE 30-16-10w, was drilling below 2775 feet. W. C. Emerich et al's Hogy 1, CW½ SW NE 20-16-10w, west of production, was drilling with rotary below surface pipe. Central Petroleum Company et al's Talsky 1, CEL SE NE 8-16-10w, was testing Arbuckle lime, logged at 3288-3308 feet, with 3000 feet of oil standing in the hole.

#### Wherry Pool Extended

C. L. Carlock et al's Rennolett 2, SEc NE 36-20-8w, extended Wherry pool, Rice County, ¼-mile northwest. A potential of 47 barrels daily was established from conglomerate at 3329½ feet.

Skelly Oil Company extended Schroeder pool, Ellsworth County, ¼-mile east when Janssen 1, CNL NW SE 18-17-9w, was completed for a maximum potential of 3000 barrels daily. Arbuckle lime was drilled to 3220 feet.

C. L. Carlock et al's Conrad 1, CW½ SW NE 15-20-6w, wildcat between

Wherry and Welch pools, Rice County, cored a show of oil in Mississippi lime at 3308-14 feet. Standard tools were rigged up to drill in and test.

Jock Garder et al's Rahn 1, NWc SW 13-34-5e, a south offset to the Rahn discovery, missed the Bartlesville sand pay and was abandoned in Mississippi lime at 2984 feet. The discovery made an initial potential of 2400 barrels daily from Bartlesville sand at 2950 feet. Other tests in the general area have either missed the pay zone, or failed to drill shows, illustrating the lenticular sand pecularities of the region.

National Refining Company abandoned Kraft 1, Section 2-17-11w, ½-mile northeast of production in the Kraft pool, Barton County. When drilled to 3400 feet in Arbuckle lime, hole filled with water.

Simpson Oil Company et al's Rush 1, CW½ NW SW 33-14-14w, southwest of Gurney pool, Russell County, was abandoned in Granite Wash at 3230 feet. Stanolind Oil & Gas Company's Werries 3, NW SE SW 10-20-11w, ¼-mile from Ellinwood and Silica pools, Barton County, was abandoned at 3305 feet in Arbuckle lime after making only 1 barrel of oil and 13 barrels of water following a 1000-gallon acid treatment.

Alpine Oil & Royalty Company's Schartz 1, CNL NW SW 1-20-12w, ¾-mile west of Ellinwood West pool, was dry in Arbuckle at 3344-86 feet.

Aladdin Petroleum Corporation's Bitikofer 1, CN½ NE NW 1-20-1w, wildcat discovery west of Ritz-Canton pool, McPherson County, and near the abandoned Wenger pool, established a temporary potential of 49 barrels daily. Gas gauged 3,500,000 cubic feet. Pay is Mississippi lime at 2907-16 feet, topped at 2885 feet.

J. S. Barwick and O. J. Fleming located Borrell 1, CNL E½ SE 3-15-11w, 7 miles northwest of Stoltenberg pool, Russell County, on a Magnolia Petroleum Company farm-out. Scott-Carey Oil Company has rig at Benscheidt 1, CSL NW SW 22-27-1w, Sedgwick County, ¼-mile east of George A. Fuller's Kansas City lime discovery, which began making considerable water with the oil. Operators last week were rigging up to deepen to Arbuckle lime.

Palmer Oil Corporation located Stratman 1, CS½ SE NW 15-17-10w, 3½ miles northwest of Wilkens pool, Ellsworth County. Cities Service Oil Company was moving in materials at Kanak 1, SWc 12-16-8w, 10 miles northwest of Stoltenberg pool.

Clay Drilling Company et al have started Bahr 1, CWL SW SE 27-18-15w, ¾-mile east of gas production in the Otis-Albert area of Barton County. W. N. Bartlett has rotary rig at Hulme 1, CE½ SE SW 9-20-12w, 3 miles west of Ellinwood pool.

M. B. Blake was rigging up tools at Schmidt 1, CWL SE SE 35-19-8w, ¾-mile from gas production in the Lyons pool, Rice County.

Four miles south of Pawnee Rook pool, Pawnee County, Magnolia Petroleum Company was drilling at Smith 1, CEL NE NE 12-21-16w. Stanolind Oil & Gas Company staked Abnert 1, NEc 10-22-12w, a semi-wildcat ½-mile south of South Sittner pool, Stafford County.

Jones Brothers have rigged up a machine at Mahoney 1, CSL SW SW 8-14-12w, south of production in the Bunker Hill pool, Russell County. Jones & Shelburne located Rein 1, CN½ SE SW 27-14-13w, ½-mile south of Hall pool, Russell County.

One-half mile from southwest edge of Bemis pool, Ellis County, Amerada Petroleum Corporation was drilling with rotary at Hadley 2, CW½ NW SE 31-11-17w. Alva Billings located Vanek 1, SWc SE 25-14-10w, located 9 miles northwest of Stoltenberg pool, Ellsworth County. It is a farm-out of Cities Service Oil Company.

Three miles south of Larned, Pawnee County, Lauck & Moncrief et al's Gilkison 1, CE½ NE SW 21-22-16w, was abandoned at 4125 feet in dry Arbuckle. A log disclosed the following tops: Anhydrite, 1024 feet; Ft. Riley, 2190 feet; Lansing, 3641 feet; Base Kansas City, 3947 feet; Sooy conglomerate, 4024 feet; Simpson, 4083 feet; and Arbuckle, 4105 feet.

H. H. Royer's Kroch 1, NEc NW 28-18-4e, north of Propp gas pool, Marion County, failed to get a show in Mississippi lime at 2431-62 feet and was shut down for orders.

Gore & Finsten abandoned Burmeister 1, semi-wildcat in CN½ NW SE 27-16-11w, north of Harzman pool, Barton County, at 3415 feet in re-worked Arbuckle lime, topped at 3386 feet. Vickers Petroleum Corporation's Valenta 1, CW½ NE NE 31-16-11w, in the Krier pool area, topped Quartzite at 3280 feet and was abandoned at 3283 feet. In the Ainsworth area of Barton County, Stanolind Oil & Gas Company abandoned Deal 3, CSL SE NE NE 36-16-13w, at 3372 feet in the Arbuckle. Their Schmidt 3, CWL NW NE SE 35-19-11w, was abandoned in Arbuckle lime at 3364-87 feet.

# Illinois

## *Coles May Be Added to State's Producing Counties*

Recovery of saturation in the Trenton lime in the Centralia pool, completion of a Devonian well in the same field with a potential of nearly 10,000 barrels, and probable opening of a field in Coles County featured the week.

Ames-Hicks' Brown 1, first test ever drilled to the Trenton in the Centralia field, lot 10, block 5, Second Home Terrace addition, City of Centralia, was waiting on cement after 4080 feet of casing was set to test 23 feet of pay at 4018-41 feet. Because the formation never has been tested in the area before, geologists were unwilling to commit themselves as to the well's possibility.

About two miles northwest of the Trenton test, Gulf Refining Company completed Community Buehler 1, E½ NW SW 1-1n-1w, with an initial of 3710 barrels in nine hours through open tubing and casing, indicating a potential of 9868 barrels a day. During the first three hours, the well made 1355 barrels, an average of 452 barrels an hour. It is producing from pay at 2882-98 feet after a plugback from 2936 feet. The Devonian was topped at 2837 feet. Another big completion by the company was Buehler 17, CE½ SE SW 1-1n-1w, which, in its best 24-hour test, flowed 4300 barrels through open tubing and casing. Both wells are in the northern extremities of present Devonian production in the field, but are still more than a mile south of the pool's boundaries for shallow production. Shell Oil Company and Adams Oil Company are interested in the Community Buehler well.

Probable extension of the field's Devonian production ¾-mile north was indicated when W. C. McBride, Inc., set casing at 2882½ feet in Carson 8, SW SW NE SE 35-2n-1w, after excellent saturation was recovered. Bottom is at 2898 feet. The location is near the north boundaries of shallow production.

In Coles County, two miles south of Mattoon, Carter Oil Company's J. H. Seaman 1-A, SE SE SW 35-12n-7e, flowed 3½ barrels in 30 minutes by heads from McClosky lime, indicating prospects for a new field. The well was continuing to flow by heads. Casing was set at 2002 feet, or 5 feet off bottom. Location is only a short distance from J. H. Seaman 1, which was drilled through the St. Peter and then plugged back to explore a McClosky showing. However, even though it did produce a small amount of oil, it finally was abandoned.

Northwest 2½ miles of the Keensburg field in Wabash County, Burr Lambert's Seiler 1, NE SE NW 30-1s-12w, recovered six feet of McClosky saturation between 2617 and 2626 feet, and was to be drilled in immediately. It was reported the well also found saturation in the Benoist sand. Drillable casing was set opposite the Tar Springs and Benoist sections.

Pure Oil Company's Mattie Aldridge 1, Jasper County wildcat in NE NW 17-5n-10e, cemented casing to test a McClosky show, with bottom at 2850 feet. The test is about 3 miles southwest of the county's only field, the recently-opened Boos pool, and a mile west of the company's Redmon 1, a Devonian test now drilling below 4200 feet. The Redmon venture is in the CE½ NW NW 16-5n-10e, and is the first test in the area to go below McClosky depth.

Derrick was being erected for an interesting Devonian test a mile west of the Lake Centralia-Salem field in Marion County, Picard and Mary McGuire's West Estate 1, NE NE SE 35-2n-1e, Odin township.

Roger C. Young's Whittington 1, SE SE SW 30-4s-3e, near Ina in Jefferson County, a wildcat, was coring below 2800 feet. It is slated to test the St. Louis lime, and possibly the Devonian.

Tide Water Associated Oil Company plugged Everett Bunting 1, 5 miles northwest of Albion in Edwards County, SE SE NW 21-1s-10e, after drilling through the McClosky.

## *Illinois Permits*

Permits for drilling 118 tests were granted by the Illinois Department of Mines and Minerals last week, an increase of 31 over the previous week's 87.

Marion County, with 49 authorized

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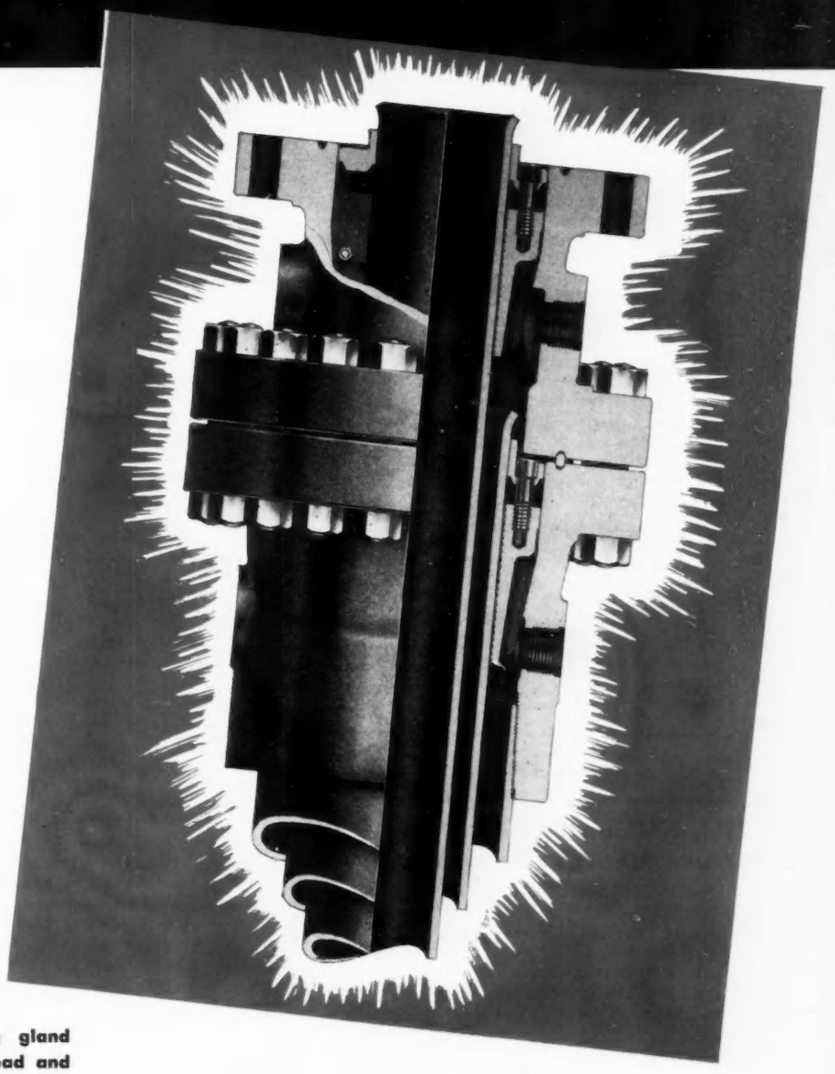

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tests, led the field, followed by Fayette, 26; Clinton, 19; Wabash, 5; Richland, 4; Bond, Lawrence, Madison, Wayne and White 2 each, and Clark, Jasper, St. Clair, Saline and Washington, 1 each.

## Kentucky

### *Pattyville Pool Extended Southwest 1½ Miles*

In Ohio County, extending the Pattyville pool 1½ miles southwest, C. S. Harmon's Tuttle 6 was a 10-barrel completion in the Jett sand at 300 feet.

Abandoned was Sun Oil Company's Corydon Unit 4, in the Corydon section of Henderson County, which was drilled to a dry St. Louis, plugged back and casing set to the McClosky, which showed salt water when plug was drilled in.

In the Glenville pool of Ohio County, Master Oil Company's Richmond 4 was a Jett-sand completion, rated at 55 barrels a day following 40-quart shot. The Jett was topped at 1195 feet, and bottom was at 1230 feet.

In the Hewlett pool of Daviess County, R. Hal Compton's Jackson 1 was a 40-barrel combination well in Jones and Jett sands. Total depth is 1685 feet.

Among the 10 first reports in western Kentucky last week, Sohio Corporation spudded a wildcat on the Aud Aud 1, 1½ miles southeast of Gatewood, Daviess County.

## Indiana

### *Posey County Wildcat May Open Mansfield-Sand Pool*

North of Caborn in southwest Robinson Township, Posey County, Gulf Refining Company's William Lang 1, SW NE NE 7-6s-12w, was showing for a shallow pool-opener in the Mansfield sand at 1130-60 feet, which on a drill-stem test, made 162 feet of oil and 412 feet of mud in 50 minutes, operators were preparing to set casing, and may make location for another McClosky test on the same lease.

In Point Township, Posey County, where Ryan & Brown cemented again to shut off water at John W. Spencer 1, prospective Aux Vases sand pool opener, W. F. Lacy located Manson Reichert 1, SW NE SW 25-7s-15w.

Kelly-Thomas-Flanders have spudded an east outpost to the Rockport gas field of Spencer County, about ¾ mile from production, the William B. Kincaid 1, NW SE 28-7s-6w. Abandoned through Palestine sand was a west outpost to the Rockport field, a mile from production, Henrickson & Seitz' Williamson Heirs 1, SW NW 31-7s-6w.

Abandoned through the McClosky at 1765 feet was Al Walker's Oscar Schmidt G-1, NW NE NW 24-3s-9w, Barton Township, eastern Gibson County. Location was just south of Walker's Oscar Schmidt 1, completed for a small pumper last year in the Pottsville sand.

West of Princeton, Gibson County, in an old Pennsylvanian sand field, Major Oil Company of Indiana's Knight 1, NE SW SW 2-2s-11w, was cleaning out following 20-quart shot in the Cypress at 1894-1905 feet. It was indicated the test may deepen to the McClosky.

In Columbia Township, eastern Gibson County, about three miles northwest of Princeton, Cypress and McClosky wells were added to the East Francisco field. Midwest Development Company's Harrison Bryant 3, NW NE 15-2s-9w, was rated a "small pumper" in the Cypress following a 10-quart shot at 1370-80 feet. Midwest Development Company's O. M. Bauer 1, SE SE 10-2s-9w, was rated a 50- to 75-barrel well in the McClosky.

Spudded was a wildcat in southeast Gibson County, Jackson Township, near Warrentown, Illinois-Indiana Basin Oil Corporation's Leo Boeglin 1, CE½ SE NW 10-4s-10w. A Carter Oil Company farm-out, the test is being drilled by Brooks Dozier, cable-tool contractor of Vincennes.

## Forest City Basin

### *Four Locations Staked As Nebraska Activity Increases*

Nebraska's long awaited drilling campaign was materializing last week with 4 new locations staked, and 6 others pending.

Harry Harper had a rotary rig at Siberson 1, SE NE NW 20-1n-16e, on an 80-acre test a mile southeast of the Bucholz producer in Richardson County.

In Nemaha County, H. J. Galamba, J. O. Isaacs et al have contracted for two wildcats to start within a week: Lehr 1, Section 25-5n-16e, 3 miles southeast of Auburn, and Ord 1, Section 8-5n-16e, 2 miles northwest of Auburn.

Ten miles north of the Bucholz producer, Indian Territory Illuminating Oil Company has a proposed location in Section 29-3n-16e. In the Falls City sector, Skelly Oil Company has moved in a stratigraphic crew that had been working in Missouri. The Ohio Oil Company has a surface crew in the area.

Forest City Basin Syndicate's Windle 1, SE NE SE 3-1n-15e, 3 miles north of the discovery in Richardson County, was spudded. Pawnee Royalty Company's Bucholz 1, CNW SW 17-1n-16e, has produced in excess of 8000 barrels. Two state representatives were at the well, checking its producing capacity to determine whether it can qualify for Nebraska's $15,000 bonus for the first well to produce 50 barrels of oil daily for 60 consecutive days.

A new still was erected at Searle Petroleum Company's refinery at Omaha, to handle additional crude from the Falls City sector. At present, runs are averaging 500 barrels from all sources, but the addition will make it possible to step up runs to 1000 or 1500 barrels daily.

In Jefferson County, northeastern Kansas, Young & McLaughlin's Mcleod 1, CNW SW 4-10-20e, northeast of McLouth, was testing with 750 feet of 21.3-gravity oil in the hole. Mississippi lime was topped at 1470 feet, and hole bottomed at 1596 feet in the formation. When tanks and connections have been completed, an acid job may bring in a commercial producer which would prove an impetus for this area.

S. W. Forrester et al have rigged up standard tools at Altenbernd 1, SWc SE NW 35-12-20e, 3 miles east of Lawrence in Douglas County, Kansas, for an Arbuckle-lime test. West of this wildcat, Kerlyn Oil Company's Wise 1, CSE SW 28-12-20e, near Lawrence, topped Mississippi lime at 1185 feet and set 6-inch pipe at 1185 feet. It was deepening below 1452 feet.

## New Mexico

### *Arrowhead Pool Extended Southeast by Good Well*

Completions in the Arrowhead pool, Lea County, advanced production southeast and accounted for a large natural producer near the discovery well. Preliminary gauge of Continental Oil Company's State 7-J-2, C NW SE 2-22s-36e, ½ mile south of the discovery, rated the flow at 205 barrels of oil per hour when tested through casing with drill pipe in the hole. The well later flowed 120 barrels of oil per hour through ¾-inch tubing choke, with gas volume averaging 1,400,000 feet daily. Hole is bottomed at 3781 feet.

Trend of production to the southeast remains open, as indicated by Humble Oil & Refining Company's State 2-M, C SW SE 18-22s-37e, in gauging 392 barrels of oil in 8 hours through ⅞-inch choke after using 3000 gallons of acid at 3720 feet, or 302 feet subsea. Amerada Petroleum Corporation has authorized a west offset. A north extension is to be sought by Gulf Oil Corporation in State-Ramsey 6, C SE NE 35-21s-36e. The Arrowhead pool was only recently given a separate designation, having been divided between the Penrose and Eunice areas on proration schedules.

Vacuum field accounted for 5 of the 8 new operations assigned Lea County areas last week. Magnolia Petroleum Company staked 4 on its State-Bridges leasehold, to be drilled as company-owned rigs are released from wells nearing completion. This development is on the north and northwest rim of the field. The Texas Company is carrying on a similar drilling program on the south end, and a new operation involves State 4-M, C SW NW 1-18s-34e.

The Ohio Oil Company farmed out a 320-acre lease on the east edge of the Penrose field to Danglade and Clower, who have started operations on Wortham-Ohio 1, CW½ NW NW 11-22s-37e, offsetting production. Continental Oil Company et al's Lynn 4-A-28, C SW SE 28-23s-36e, situated in the comparatively narrow Lynn pool, flowed 24 barrels of 31.5-gravity oil per hour through ¾-inch tubing choke from lime at 3650 feet.

Slight reduction in the allowable production of Lea County wells is due in June as a result of the Oil Conservation Commission having agreed to hold the total output of the state to 106,700 barrels daily, the figure recommended by the United States Bureau of Mines. Eddy County fields have been assigned a top allowable of 65 barrels daily per well the past 8 months. However, Sinclair Prairie Oil Marketing Company, largest buyer, has restricted its purchases to approximately 85 percent of the allowable since April 1. The Texas Company applied 10 percent pipe-line proration to its Lea County run during May.

# North Texas

## *Bend Series Producers Restore Bonita as Deep Oil Area*

Two oil strikes from lower section of the Bend series restores the Bonita pool, eastern Montague County, as an important deep producing area after these and other tests missed the discovery pay. Sinclair Prairie Oil Company's A. P. Howard 2, south offset to its discovery, flowed 310½ barrels of oil natural through 7-inch casing in 3 hours after perforating pipe with 86 shots at 5443-58 feet. Perforations at 5447-49 feet yielded 500,000 feet of gas, and the oil flow resulted from shot holes made at 5449-58 feet, indicating 9 feet of pay section. Tubing has been landed for official proration gauge. Howard 2 proved dry in the discovery zone at 5240-49 feet, and offered little encouragement for production on drilling in Ellenburger at 5803-5852 feet.

Prior to completion of the lower Bend producer, Magnolia Petroleum Company's Gilbert 1, ½ mile northeast outpost, cored oil-saturated conglomerate at 5426-34 feet. The well flowed when formation tester was used on this horizon. Seven-inch pipe was cemented at 5425 feet, and production test was underway late last week. Gilbert 1 logged top of Bend at 5205 feet, or 32 feet lower on structure than Howard 2, while both entered the oil zone at identical subsea depths.

Sinclair Prairie Oil Company's Doty 1, west offset to the Bonita discovery, was carried to Ellenburger at 5820-6025 feet, then plugged back, resulting in a column of salt water from the 5200-foot zone. Perforations are due to be made opposite the 5400-foot zone.

Production test was underway late last week on British-American Oil Producing Company's Martin 1, ½ mile north of the Ringgold record-depth producer, with 7-inch pipe cemented at 5680 feet. Formation tester used on oil-saturated conglomerate at 5681-92 feet with hole bottomed at 5695 feet in Bend, topped at 5643 feet, revealed adequate oil and gas to indicate an oil producer. Fain-McGaha Oil Corporation's Spring 1, west offset to the 5704-foot strike, was drilling at 4250 feet, and Gulf Oil Corporation's Worsham Estate 1, southwest offset, prepared to spud. Sinclair Prairie Oil Company's Milam 1, 3½ miles northeast of production, was drilling at 4910 feet.

Walter Gant and Continental Oil Company's Brown 1, 5½ miles northeast of Bowie, probably record holder for the state on number of acid treatments, cleaned out to 6253 feet, plugged-back depth, and filled 100 feet of oil in 4 hours from Bend, topped at 6077 feet. It is due to be acidized again if the water shutoff holds. Harvey Drilling Company and Sinclair Prairie Oil Company's Threadgill 1, western Montague County wildcat, was drilling at 5300 feet.

Sunray Oil Company and Ramsey Petroleum Corporation's Stambough 1, south offset to the only deep failure within the productive limits of the Nocona field, was awaiting completion test with 5½-inch pipe at 5282 feet, or 3 feet off bottom. Broken saturation in conglomerate at 5199-5219 feet is of Bend zone, topped at 5186 feet, or 16 feet higher subsea than the Ellenburger failure. Sinclair Prairie Oil Company's Benton 1, wildcat on east edge of Nocona townsite, passed up nominal oil show in upper Strawn, and was drilling at 4090 feet.

Another Ordovician wildcat failure is credited to Clay County. Staley Oil Company and W. B. Omohundro's Percifield 1 quit at 6280 feet in Ellenburger, entered at 6185 feet. Bridwell Oil Company's Halsell 4-A, south outpost for the Halsell pool, was drilling at 5810 feet with the Ordovician as its next objective. Continental Oil Company et al's O. O. Ross 1, southwest offset to the partnership's 5400-foot Bend strike for the Jolly pool, was drilling at 4014 feet. L. T. Burns et al's Tom Watson 1, wildcat near south line of Clay County, proved dry in the Canyon and Strawn series, and was drilling shale at 4250 feet. E. C. Norwood et al's Hapgood 1, 5½ miles south by west of Ralston, has spudded on a 6000-foot contract.

Adoption of a new method of allocating production allowables in the K-M-A deep area effective with the June schedule, along with a 7339-barrel cut in the daily quota represents a substantial change in the setup. The field has been prorated on a well-acreage basis since January, 1937, and the revised plan allocates 50 percent of the allowable for acreage, with average bottom-hole pressure and per-well factors determining 30 percent and 20 percent, respectively. The bulk of the low pressure wells are in the north and east portions of the structure, while the area to gain in allowable under the plan is largely served by Sinclair Refining Company's pipe line facilities. This concern is restricting runs to 75 percent of the allowable, thereby making it impossible for producers to enjoy the advantages afforded by the 3-factor method. The change was sought by operators to curtail excessive gas withdrawal, and to eliminate the assignment of greater allowable than low pressure wells could produce. Owners of properties subjected to pipe-line proration in this and the Consolidated and Hull-Silk areas are accepting offers to market that portion of the allowable refused by pipe line outlet through tank truck sales at 75 cents per barrel to local refineries.

Magnolia Petroleum Company's Thom 3, prospective Ellenburger producer for K-M-A and 1⅝ miles southeast of the lone deep producer, failed to take 500-gallon acid injection at 4419-4421 feet under 2000 pounds pressure. Additional cement will be drilled from the plugged-back hole. Consolidated Oil Company's Barnes 1-K, SE NE SW H&TC Section 11, Block 7, between K-M-A and Consolidated areas, landed casing to try for an oil producer from saturation in Ellenburger at 4336-55 feet. George W. Cooper et al's Waggoner Estate 33-C, southeast portion of the A. Gibson Survey A-455, is to explore the Ellenburger on a block to the northwest of the K-M-A field.

# West Texas

## *Soma Shallow Area Has Its Second Well in Yates*

The second producer for the Soma shallow pool, western Crockett County, missed the big gas flow but is capable of flowing by heads from the Yates sand. H. D. Lewis, Shannon & Graham's Noelke 1, east offset to the discovery, encountered first oil at 1064 feet in Yates section, topped at 900 feet with an elevation of 2369 feet. The well began flowing by heads in drilling to 1078 feet, where operations were halted to erect tankage. No estimate has been given as to the daily capacity of the well, owing to the brief period it has been permitted to flow. The gas volume is rated at 250,000 cubic feet daily in contrast to 19,250,000 cubic feet credited to Soma Oil & Gas Syndicate's Noelke 1, which has been shut in since earning an oil potential of 788 barrels daily. Owners are awaiting the outcome of the new test before taking steps toward reducing the gas flow.

Mudge Oil Company's Noelke 1, northeast offset to the Soma discovery, was held up by a fishing job at 470 feet. Other projected tests on close-in acreage have been held in abeyance.

Gulf Oil Corporation's Waddell 31, Crane County wildcat between the Gulf-Waddell and Dune fields, failed to record any appreciable increase in pay in drilling to 3543 feet. The hole contains 2900 feet of 35-gravity oil encountered at 3312 feet.

Conversion of a wildcat gasser in Ward County into an oil producer was indicated last mid-week when greater penetration of the Delaware sand by Kenneth Slack et al's Hayes 1, three miles northeast of Quito, sprayed 25 to 50 barrels of oil while blowing 20,000,000 cubic feet of sweet gas daily. Production is from the 5041-90-foot horizon, with an elevation of 2740 feet. The volume of gas is unusually large for the Delaware zone in West Texas, and must be reduced before making further effort to bolster the oil yield. The well began making gas in mid-April, then blew out of control and caught fire, thereby delaying operations. The structure embraces a large area with several dry holes and an abandoned oil well providing subsurface control.

Atlantic Refining Company's University-Wickett 1, recent discovery completion for Ward County with an initial yield of 452 barrels of oil and 1540 barrels water from lime at 2920 feet, failed to resume its flow when plugged back to 2912 feet and tested. Perforation of formation with 30 shots at 2895-2905 feet, followed by acid treatment, developed a small volume of gas. An additional injection of acid was under way late last week. Gulf Oil Corporation's Wristen 5, Ordovician test for the Shipley

pool, Ward County, was drilling lime at 7390 feet.

Southwestern Andrews County was assigned two additional wildcats by Atlantic Refining Company to forestall lease expirations on acreage near Helmerich & Payne, and Atlantic Refining Company's University 1, which logged additional oil saturation in drilling to 4425 feet. Production test was under way at the latter depth. Possibility of a new oil discovery was indicated last week when the well filled 400 feet with 36-gravity oil from lime section at 4260-4304 feet. Rotary was used in deepening from the latter depth, with lower pay topped at 4350 feet. A north offset to this prospect is starting up, while the other test will be University 1-23, C NE NE Section 23, Block 11, two miles south of the active operation.

Sixth oil completion from the Holt pay on the west edge of the North Cowden field is the largest of the group, and will encourage additional development after several recent tests made disappointing showings. Llano Oil Company's Holt 2-B, NWc NE PSL Section 18, Block A, southeast offset to the deep discovery, flowed 487 barrels of 38-gravity oil through open tubing in 24 hours after using 2000 gallons of acid in pay at 5135-47 feet. Top of Clear Fork was called at 5099 feet, with an elevation of 3094 feet. The hole is bottomed in dry lime at 5150 feet.

Andy Faskin and associates have made location for a Howard County wildcat on a block originally assembled by Dick Graham et al, who abandoned operations after drilling to 480 feet. Faskin et al have sold protection acreage to Tide Water Associated Oil Company and others at $10 per acre, and contracted to drill Pete Johnson 1, NE NE T&P Section 34, Block 32, T-1-N, to 3000 feet.

### *Callahan County Shallow Strike Pumps 154 Barrels*

South Central Callahan County recorded a shallow oil strike through completion of Ungren, Frazier and Beams Drilling Company's Jackson 1, near SEc SW T&P Section 85, Block 12, from sand at 920-26 feet with broken lime and shale to 928 feet. The well flowed and pumped 154 barrels initial. It is a mile southwest of a small pool, and is near 3 failures which revealed the presence of the sand.

Expansion of the Nowels one-well pool, southern Haskell County, to the south into Jones County was in prospect last mid-week on strength of oil show encountered by J. C. Hunter et al's Bettis 1, NEc of 358-acre tract, T. C. Ry. Section 1, in Palo Pinto member of the Canyon at 3458-63 feet. It is 4000 feet south by west of K. B. Nowels et al's Pardue 1, which made a 35-barrel pumper from Palo Pinto at 3398-3404 feet. The new test is 18 feet higher on the oil pay. The Nowels pool may mark the beginning of a new production trend that lies west and parallel to the Griffin, Avoca and Ivy trend of pools.

### *Texas Permits*

The Texas Railroad Commission last week approved permits for drilling 378 new wells in Texas, 232 more than were allowed the week before.

Seven permits were granted in the East Texas field, with 5 in Gregg and 2 in Rusk County. From the remainder of the East Central Texas area, 21 locations were reported, including 11 in Marion County. Permits for drilling 66 wells were approved in West Texas, including 16 in Ector County, while operators in West Central Texas were permitted to drill 33 wells, with 10 in Callahan and 10 in Shackelford County.

Southwest Texas led the state with 103 locations, including 15 in Jim Wells, 12 in Webb, 11 in Starr and 11 in Duval County. Gulf Coast operators listed 52 locations.

There were 67 locations approved in North Texas, including 18 in Archer County, and 29 were reported from the Panhandle, with 20 in Hutchinson County.

### *Ask 20-Acre Spacing for City of Robstown Field*

Standard 20-acre spacing for wells in the new City of Robstown field was requested by Richardson Petroleum Company at a hearing before the Texas Railroad Commission last week. The company's Rudolph Studer 1, north of Robstown in Nueces County, was the discovery.

The city of Robstown has already passed two ordinances governing drilling operations in the city limits, and these correspond almost exactly to those now in effect in Aransas Pass. The townsite has been divided into 44 drilling districts of approximately 20 acres each.

M. C. Dillingham, petroleum engineer for Richardson, asked that the commission require 1000 feet of surface casing cemented to the surface, and an oil string set with at least 400 sacks of cement.

The allocation plan calls for an additional 10 acres to be assigned to the final well on a lease, and the company asked that proration be on acreage and per well, with 75 percent assigned to acreage. Sun Oil Company asked for straight acreage proration for the field.

The well, producing oil from 5200 feet, encountered a heavy gas sand at 4600 feet, from which gas is to be sold to the city of Robstown. Some water trouble has been encountered, but Dillingham told the commission that if the water can not be shut off successfully, the gas sand will be squeezed off and only the oil produced. The company asked that it be permitted to produce oil through the tubing, and gas through the casing in the event it was successful in shutting off the water.

### *Hitchcock Hearing*

The Texas Railroad Commission has scheduled a hearing for June 5, at Austin, to consider an application for a higher allowable for the Hitchcock field, Galveston County.

Revision of the allocation method in the Deep Emperor field, Winkler County, was requested by Continental Oil Company and Texon Oil & Land Company at a hearing before the Texas Railroad Commission last week. The field is prorated on acreage and potential, with 50 percent assigned to each factor, and a maximum of 20 acres assignable to the wells.

Continental Oil Company protested that the field had been drilled on 10-acre spacing, with the company's lease having been drilled approximately one well to 10 acres.

Van A. Mills, petroleum engineer for Continental Oil Company, asked that proration be allocated on three factors: 50 percent per well; 25 percent potential, and 25 percent acreage, with a maximum of 20 acres assignable to one well and a provision that no well may be drilled closer than 330 feet to a boundary line of a proration unit.

Stanolind Oil & Gas Company, C. V. Lyman and Phillips Petroleum Company all asked that a larger percentage go to acreage. They asked that at least 50 percent, and as much as 100 percent, be assigned on this basis.

### *Ask Increase to Cope with Sand in Louise Field*

Higher allowables for seven wells in the south end of the Louise field, Wharton County, were requested by Gulf Stream, Inc., at a hearing before the Texas Railroad Commission last week. The increased production was requested to enable the company to cope with sand and water troubles which affect the wells. Each well is now assigned about 38 barrels, and some of them make as much as 25 to 50 percent water along with sand.

Walter G. Dodd, manager of the company, indicated that between 60 and 75 barrels should be produced from the wells in order to keep the water and sand moving and to enable the company to operate the wells profitably.

### *Texas Gets WPA Funds For Well-Log Work*

Allocation of $202,464 by the Works Projects Administration to the geology department of the University of Texas, for the examination, charting and correlation of the logs of all wells drilled for oil and gas in Texas since 1896.

Under the grant, a permanent record will be made of all oil wells drilled in the past 44 years which will be available for study by geologists and others interested.

### *Orange Grove Hearing June 3*

Operating rules for the new Orange Grove field, Jim Wells County, will be considered by the Texas Railroad Commission at a hearing scheduled for June 3, at Ausin.

## East Texas

### *Lower Trinity Activity Shifts To North End of Structure*

Exploration of the lower Trinity horizon in the Mexia field has shifted to the north end of the faulted structure through starting of a projected 6100-foot test by S. J. Taylor, Lytle and Phillips on the J. W. Reid 117-acre tract. A half-dozen deep tests have been drilled within and adjacent to the Woodbine producing area, but the majority developed junked holes, including the original Trinity test, which qualified as an oil and gas producer for a brief period.

Tom Shaw et al's Wynne 1, eastern Kaufman County wildcat, was drilling shale and lime at 6290 feet, having logged a comparatively thin section of Massive Anhydrite at 6115-6255 feet.

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# Southwest Texas

## *New Fields and Extensions In Three Active Counties*

A profusion of new fields and extensions added production in Jackson, Victoria and Jim Wells Counties during the past week. The prime discoveries were in Jim Wells County, which for months has been at the top of the list in successful wildcatting.

M. M. Miller & Sons' Gallagher 1, Block 21, Gallagher subdivision and 4 miles southeast of Sandia, cored sand at 5189-93 and 5199-5203 feet. On a drill-stem test at 5187-5215 feet, using ¼- and ⅜-inch chokes, the well recovered 1000 feet of pipeline oil under 50 pounds pressure in 15 minutes. Casing was run for completion. The test is opening a basal Frio sand area in the extreme northeastern portion of the county.

Henshaw Brothers added about 3500 feet southwest of the Wade City field with a producer in the lower McNeill sand. Perforations had been made at 4905-10 feet with 15 shots and the well flowed 7 barrels of oil per hour through 11/64-inch choke under 1100 pounds casing and 600 pounds tubing pressure. The well leads to considerable new work at the south end of the field.

The new Orange Grove field received its third potential producer which will have an important bearing on the field. H. H. Howell's Schroede 2, 933 feet northeast of the first test, cored a sand section between 5078-5116 feet, there being a total of 25 feet of good sand. The well was about flat with the preceding operation indicating that production will extend northerly.

The Wade City trend has been gaining in activity as an offsetting program is causing a number of operations to three oil sands in the Vicksburg zone between 4750 and 5000 feet.

Colton & Colton added Victoria County to the group of Vicksburg sand producing areas with the completion of Terrell 1, John B. Sideck survey, several miles southwesterly from the Cologne field. From a sand at 5275-85 feet, the well flowed 5½ barrels of 27.6-gravity oil per hour through 3/16-inch choke with pressures 550 pounds on tubing and 1250 pounds on casing. The choke was reduced to 3/32-inch and the well flowed 75 barrels of oil per day under 900 pounds tubing and 1700 pounds casing pressures. Several miles east and logging about flat, British American Oil Company's Warden 1, E. Donough survey, was coring for the same sand.

Texas Gulf Producing Company was still testing Kester Heirs 1, discovery of production in the Bloomington area of Victoria County. It was flowing gas and distillate through 5/32-inch choke under 1500 pounds working pressure after perforations had been made at 5103-15 feet. The well has attracted two more outposts on the same structure by the same operator. To the south and on the Calhoun County line, Humble Oil & Refining Company is starting a wildcat.

Barnsdall Oil Company's Lazarus 1, west outpost to the new Lolita pool in Jackson County, made too much gas on initial completion through perforations at 5934-39 feet and a squeeze job was made. It is to be retested slightly lower in the sand which is bottomed at 5933½ feet. If a producer, as is anticipated, it will widen production in this area 7000 feet to the west.

Jackson County is receiving a material boost in wildcatting as new tests are being started to the West Ranch field and the revived Mauritz area.

Coronado Corporation has reentered its wildcat on the K. L. Welder lease 3½ miles southeast of Seadrift in Calhoun County and is preparing for a series of tests. The hole is bottomed at 10,002 feet with pipe landed at 9696 feet. Several attempts were made for completion, but the hole was shut down due to legal complications which since have been adjusted.

Eura B. Oil Company's Traylor 1, on the Greens Lake prospect, also in Calhoun County, went for naught when it was abandoned at 7507 feet.

Sultex Oil Company's C. Wood 1, McGeehan survey and in southern portion of Bee County, is drilling deeper after several attempts to test a sand at 6023-42 feet failed. Casing had been set at 6126 feet and the tests were through perforations.

Norsworthy Production Company's T. C. Holeman 1, one mile northeast of the Fagan field in Refugio County, drilled to 6509 feet, plugged back and perforated at 1970-90 feet where a drill-stem test recovered 500 feet of sulphur water under 150 pounds pressure in 25 minutes. These holes were squeezed and a new set made at 2108-18 feet where the test blew out several weeks ago. It is expected to make a gas well.

## *First South Texas Wilcox Oil Flows in Colorado County*

Shell Oil Company definitely established the first oil production in the Wilcox zone along the South Texas Gulf Coast with completion of Plow Realty Company 1 on the Sheridan prospect in southwestern Colorado County. The test was said to be flowing from perforations at 5138-45 feet, which is a 5-foot portion of a 39-foot saturated oil sand slightly more than 100 feet below the top of the Wilcox zone.

Details are lacking due to the fact that this test has been drilled unusually tight on information. The best available data, however, are to the effect that the hole was carried to approximately 8300 feet and casing landed on or near bottom. A set of perforations were supposed to have been made around 8240-50 feet where the well showed oil and salt water. These perforations were reportedly squeezed and the new holes made.

One gauge was reported to have been 156 barrels of 34.5-gravity pipe-line oil in 24 hours through ⅛-inch choke under 1200 pounds tubing and 1850 pounds casing pressure. The gas/oil ratio was reportedly 1200 to 1. Later, it was said that the output had increased to between 10 and 12 barrels per hour. Some reports are that the well is making a cut of salt water, but this is doubted by many who have been closely interested in the development in the area.

Being an oil discovery completely changes the picture in this area's development. Heretofore, drilling to the Wilcox has uncovered only distillate. The new activity, however, may intensify exploration and lead to more oil fields.

Shell Oil Company is drilling at a shallow depth in Goodrich 1, a ½ mile west outpost to the area.

Allen & Morris of San Antonio were awarded the contract for a 9200-foot test on the Bruni structure in Webb County which will be carried to the Wilcox. It is Bruni 8, an offset to Bruni 7, junked after a blowout at 8959 feet. Rig has been moved to the new location from Sinclair Prairie Oil Company's Callaghan 1, northeastern portion of the county, which was abandoned at 9501 feet, after testing dry in the Wilcox zone.

## *Duval County Wildcat Opening New Field*

Bridwell Oil Company opened a new Pettus sand field three miles southwest of Fitzsimmons production with Rogers Estate 1-A, J. Poitevent survey No. 21. The Duval County wildcat cored to pay at 4321-27 feet and on a drill-stem test recovered sufficient oil to indicate a commercial producer. It was cleaning into pits at the close of the week. Location had been staked and rig was to be immediately skidded on location northeast for Parr 2 for the same company.

Three miles east of the Fitzsimmons pool, Sun Oil Company was still testing M. Garcia 1. After being shut down for pump repairs, the well again was on production and is estimated at 35 to 50 barrels of oil per day. Perforations were made in the Yegua zone at 4900-10 feet.

Taylor Refining Company et al's Parr 1, is a completion as a distillate producer to open a new Pettus pool 3 miles northwest of the Muralla field in Duval County. It flowed 45 barrels of distillate and 15 barrels of salt water per day through ⅛-inch choke under 1250 pounds working pressure after perforations had been made at 4683-88 feet.

Webb County had several wildcats in the completing stage which may be opening new pools. Glenda Oil Company found a small oil showing in R. Saldivar 1, Section 657, 18 miles southeast of Laredo. The sand, in the Mirando zone, is at 1001-8 feet. The test was being swabbed late in the week.

W. C. McBride's Leal 2, Section 461, 8 miles north of Bruni, has been perforated at 2529-30½ feet and was flowing gas and a spray of oil with a slight showing of water through 3/16-inch choke. Pressures were 650 pounds on tubing and 785 pounds on casing.

## *Cedro Hill Hearing*

The Texas Railroad Commission has scheduled a hearing for June 10 to consider revision of the rules governing cement for wells in the Cedro Hill field, Duval County.

## *Recycling at Hamman*

Hamman Exploration Company has been granted a permit to recycle gas produced from the Hamman field, Matagorda County. The same order classified five wells as gas wells which are producing from sand at 9100 feet.

# Texas Gulf Coast

## *Wildcat Successes Up in 1940; Scattered Tests Are Promising*

With discovery of Alta Loma, Galveston County, Texas Gulf Coast wildcat successes for 1940 exceed those for the same period of 1939. Two wildcats promised to contribute to the discovery list in Galveston County, while Brazoria, Harris, San Jacinto and Montgomery County exploration is at a high point.

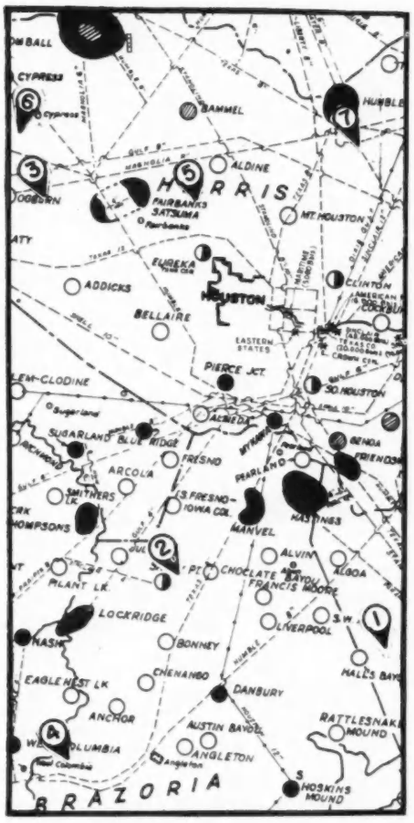
In Brazoria County, a new distillate field was in prospect as Rowan & Nichols' Hubbard 1, in the Liverpool area, southwest of Alvin and west of Chocolate Bayou, recovered 135 feet of 51-gravity white distillate and mud at 9107-34 feet on a 9-minute drill-stem test, using ¼-inch choke at bottom and ⅛-inch choke at top. Pressure was 500 pounds. Operators then cored a sand at 9156 feet. If a test of this sand is unsatisfactory, it is probable that the well can be completed in the 9107-34 foot zone for the second distillate strike of the year. Heterostegina was topped at 7200 feet, with oil and gas distillate sands cored at 8108-10 feet, 9094-103 feet, and 9107-34 feet. Water sand was cored at 8117-21 feet.

Richardson and Christian-Carpenter Drilling Company's E. Marks 1, wildcat in the Ogburn Survey, Harris County, showed possibility of another discovery as it flowed 25 stands of free 38-gravity oil and oil-cut mud on a 15-minute drill-stem test at 6449 feet. A later drill-stem test at 6614-21 feet recovered 300 feet of oil and gas-cut mud under 500 pounds pressure in ten minutes. Operators are now coring toward another sand, expected around 6700 feet. This test is 4½ miles northwest of same operator's A. Marks 1, recently abandoned at 7528 feet.

John Mayo and Christian-Carpenter Drilling Company were below 5550 feet in Josey 1, wildcat in the Cypress area, Harris County, just north of the Marks wildcat. G. F. Steger located another wildcat, Trahan 1, projected to 5000 feet, 4 miles southeast of Humble.

Two locations were staked in the Alta Loma field, Galveston County, third strike of this year in the district. Salt Dome Oil Corporation staked Lobit 1, Lot 2, Asa Brigham Survey, ½ mile north of the discovery. Stanolind Oil & Gas Company located Hulen 2 in the Brigham Survey, 2640 feet west of the discovery. This operator's Hulen 1, the discovery, continued to make 400 barrels of fluid hourly under partial control, but seemed in danger of drowning. Estimates placed the salt-water content at 40 percent. The well was brought in two weeks ago by a blowout at 9166 feet while operators attempted to recover stuck drill stem. It flowed 1000 barrels hourly wide open, and 400 barrels of 36-gravity oil hourly when flow was diverted through three 4-inch lines with large chokes. Salt water did not appear until the well had flowed for several days. The producing sand is not yet known as the blowout prevented a core recovery, but is presumed to be the upper Frio.

The large, low-relief structure was worked by Humble Oil & Refining Company and Gulfboard Oil Company. Salt Dome Oil Corporation took acreage and turned it to Stanolind Oil & Gas Company, who reworked it with reflection seismograph. Additional storage is being erected at the well. A 15-mile 6-inch line has been laid to Pan-American Refining Company's Texas City plant.




**Interest in Central Gulf Coastal wildcat and semi-wildcat activity was at a high point last week as two tests promised to become field openers, two locations were staked for confirmation of the latest strike, and a new location was announced. At (1) Salt Dome Oil Corporation staked Lobit 1, Stanolind Oil & Gas Company staked Hulen 2, both near latter company's Hulen 1, discovery well at Alta Loma, Galveston County, newest field in the Gulf Coast sector. At (2) a new field was in prospect as Rowan & Nichol's Hubbard 1, in the North Liverpool area of Brazoria County, flowed water-white distillate on a drill-stem test. At (3) Richardson and Christian-Carpenter Drilling Company's Marks 1, Ogburn area, Harris County, flowed 25 stands of free and mud cut oil on drill-stem test to indicate a new field. At (4) Glen McCarthy's Munson 1, Bailey's Prairie area, was drilling at 10,850 feet. At (5) W. M. Hobson's Allen 1, northeast extension attempt in the North Houston field, was drilling out of surface casing. At (6) Mayo and Christian - Carpenter Drilling Company were preparing to core Cockfield below 5500 feet in Josey Farms 1, Cypress area wildcat. At (7) G. F. Steger staked Trahan 1, 4 miles southeast of Humble.**

Other Galveston County wildcats were active. Salt Dome Oil Corporation's Williams 4, long east extension attempt at South Cotton Lake, was waiting on cement after setting 5½-inch casing at 6578 feet. The well, drilled to 8520 feet, was scheduled for 9000 feet, but operators lost hole below 8257 feet and could take no log of formations below that point. The test will probably be completed in the second Frio sand at 6506 feet. Humble Oil & Refining Company's Barrow 1, wildcat southeast of Cotton Lake, was coring in shale below 7856 feet. The company's state 1-247, wildcat in Galveston Bay, was at 6215 feet in shale. Standard Oil Company of Texas and Salt Dome Oil Corporation's State 61-54, wildcat on Fisher's Reef, off the Chambers County shore in Trinity Bay, was slated for abandonment after a series of tests and a period of waiting for orders.

Interest in Port Neches field, Orange County, was revived as Phillips Petroleum Company completed Stark 1, north outpost, for 135 barrels of 25-gravity oil daily through 7/64-inch choke from 15 perforations at 4555-60 feet to establish a new producing horizon for the field and the first production outside The Texas Company acreage. The well attracted attention to two other extension attempts: The Texas Company's Stark 11, a mile west of production, which was drilling at 6800 feet and reportedly 350 feet low on paleontological markers, and Oil Interests Corporation's Todd 1, location for shallow test on north edge of the dome. The Phillips Petroleum Company's Stark 11 checked 50 feet higher than The Texas Company's Stark 10 on upper markers, indicating it is higher on that segment of the dome than wells farther south. The company is expected to announce other locations soon, while The Texas Company is reportedly ready to move in light rig to explore the shallower sands. The latest extension of the area, coupled with the two long outpost tests, may preface a period of intensive flank development similar to that at Orange, Thompson and Jennings.

Eura B. Oil Company staked Hamburger 1, wildcat in Section 65 of W.C.R.R. Survey, Glen Flora area, Wharton County. It is 1000 feet north of a dry hole drilled in 1939 by Temple Hargrove and is to be taken to 7500 feet. Two new locations were staked: T. M. Neal located Fee 1, wildcat 2½ miles north of Lane City, in the Flack Survey, Abstract 22, and The Texas Company staked Peters 2 in the Hillje area, E.T.R.R. Survey, Abstract 104. Hardin County received a wildcat start in J. M. Hines Merchant 1, a mile southwest of Sour Lake in the Jackson Survey.

### Fort Bend Wildcat

In Fort Bend County, Superior Oil Corporation of Oklahoma located George 2, in the Kelker Survey on the banks of Smithers Lake, 5 miles from production at Thompsons. Fabriguez & Sacks will attempt to extend Thompson production a mile south with George 1, in the Polley Survey.

Two recent wildcat starts were drilling out of surface casing: The Texas Company's Taylor 2, in the Sugar Valley sector of Matagorda County, and Standard Oil Company of Kansas' Kamas 1, northwest flank test on Bren-

ham Dome, Washington County. In Matagorda County, Stanolind Oil & Gas Company and Amerada Petroleum Corporation's General American Life 1, wildcat a mile north of Wadsworth, was coring at 10,700 feet. The Texas Company's Pierce 1, in the Blessing area, was drilling at 8065 feet. Barnsdall Oil Company's Stoddard 1, Wilson Creek wildcat, was still fishing for drill pipe stuck at 10,295 feet. Contract depth is 10,500 feet, with an oil sand cored at 10,000 feet.

Two San Jacinto County wildcats continued active, one of them, Shell Oil Company's Coline Oil Company 1, Cold Spring area, having given promise of success two weeks ago when it flowed 600 feet of oil and 600 feet of water on drill-stem test at 7806-16 feet. It may be completed for an oil well in that zone, although at present operators are coring the Wilcox at 8178 feet. Harrison & Abercrombie's Dixon 1, wildcat south of Shepard, in the southeastern part of the county, was also coring Wilcox at 8191 feet.

In proven field activity, several outpost and new sand hopes were deflated. In Liberty County, General Crude Oil Company and Welch abandoned Fee 1 at 7510 feet to mark another failure in Esperson dome flank attempts. Stanolind Oil & Gas Company plugged back Garrow 1, south outpost to the Martha field, Liberty County, and will complete in the regular horizon at 8100 feet. In attempts to establish lower productive levels, Garrow 1 tested salt water at 8512-20 feet and 8594-8600 feet. Sun Oil Company's Smith 1, semi-wildcat north of Seabreeze, Chambers County, has been delayed by stuck drill stem. Bottom is at 8098 feet. Salt Dome Oil Corporation's William 4, in South Cotton Lake, has been plugged from 8520 to 6570 feet, where the regular pay will be tested. Tests at lower levels were unsuccessful.

Other extension attempts still held prospect of success. Sun Oil Company's Stern 1, northeast outpost at Angleton, was reaming at 10,542, near which point pipe will probably be set within a few days for production test. Titanic Oil Company's Boyt et al 1, in the Double Gum field, Liberty County, was reported testing at 8958-80 feet with bottom at 9313 feet. No results were available.

### *Fannett Field Hearing*

A hearing on the Fannett field, Jefferson County, has been scheduled by the Texas Railroad Commission for June 7. Gulf Oil Corporation recently completed three wells in an 8000-foot sand, and the hearing was called to determine whether this sand constitutes a separate field that might be entitled to a higher allowable.

### *Casinghead Gas Plant To Be Built at Lirette*

United Gas Company and Humble Oil & Refining Company will start work shortly on a casinghead gasoline plant in the Lirette field, Terrebonne Parish, to utilize a large gas reserve. The plant will also process the gas for commercial use.

United Gas Company has nearly completed a 35-mile 12-inch line from the field to New Orleans. La-Tex Construction Company laid the line. The Mississippi River crossing was made 12 miles west of New Orleans.

# Louisiana Gulf Coast

### *Terrebonne Parish Wildcat To Test Higher Sands*

Despite its failure to produce from the 7400-foot level, Barnsdall Oil & Refining Company's Nelson Development Company 1, Point Au Fer wildcat in Terrebonne Parish was conceded to be the most probable field-opener among the currently active South Louisiana wildcats. Operators were preparing a test higher up the hole of several sands indicated by electric log. This structure on Point Au Fer Island, adjoining Atchafalaya Bay and the Gulf of Mexico, has been worked twice by refraction seismograph, once by torsion balance, and lately by the operator's reflection seismograph crew, which is still detailing on the island. The company had an option on 39,000 acres at the start of the survey and has taken up the entire block. If a well is made, it is probable that The Texas Company would participate in the development, since that company owns state leases on submerged lands in the area, and part of the prospect is known to be under the water.

Resumption of activity in the Four Isles field, Terrebonne Parish, has followed an attorney general's ruling that State Mineral Lease 200, held by Louisiana Land & Exploration Company, called for continued drilling. Accordingly, the company staked State-Four Isle 1, Section 23-21s-16e, with drilling to start immediately. The field has had 15 wells drilled since the structure was discovered in 1930, but only one, drilled by Louisiana Land & Exploration Company, in 1935, had commercial production. There has been no drilling in the field for over a year. The acreage was once held by The Texas Company on a sub-lease, but reverted to Louisiana Land & Exploration Company.

Another once dormant field where activity has been resumed is Anse La Butte, St. Martin Parish, where Stanolind Oil & Gas Company brought in Bergeron 1 for 500 barrels daily from 4680 feet. The completion commands interest because of a producing horizon, because it is the company's first production in the field, and because, with the exception of Glassell & Glassell's recently successful deep flank test, it is the first in the field of any importance in several months. Glassell & Glassell have several inactive locations on which work is expected to be resumed. Stanolind Oil & Gas Company will move rig to Bergeron 1, Lease 2, Section 8-9s-5e.

#### New South Lake Charles Test

Rig will be moved in by barge for W T. Burton's Mayo Realty Company 1, new wildcat on the South Lake Charles prospect, Calcasieu Parish, Section 11-8s-11w. Burton holds 2200 acres, with Continental Oil Company and others having adjoining leases. Last test on the structure was in 1936 when Shell Oil Company's Wurmnest 1 was left at 9259 feet, with no shows. Burton's location followed extensive geophysical work.

Tide Water Associated Oil Company was digging canal to location for Delta Farms 2, 3084 feet southwest of Delta Farms 1, discovery in the Delta Farms field, Section 1-17s-22e, Lafourche Parish. The discovery, made in March, 1940, is now flowing 212 barrels of 32-gravity oil daily through 1/8-inch choke from perforations at 11,290-305 feet.

The Eola field, Avoyelles Parish, currently the most active area in Louisiana, registered its seventy-sixth well to demonstrate it possesses one of most important reserves among the fields found in the past three years. Gulf Oil Corporation completed Moliere 3 for 714 barrels daily from the Wilcox at 8575 feet. Late completions have yielded consistently high potentials.

Latest Avoyelles Parish wildcat is Gulf State Exploration Company's Long Bell Lumber Company 1, near Hotwell, Section 46-4n-3w, on which operations will begin immediately. Two tests by the company, Cappel 1, a mile north of latest location, and Dunnam 1, in the immediate vicinity, had strong shows but could not be completed.

#### Talk Avoyelles Parish Wildcats

Rumors of three wildcats to be drilled in Avoyelles Parish were afloat, with operator's names not revealed. Road is under construction from Normands on Highway 166 to lease in Section 5-5n-5e, Boyett Fee, and from a point two miles east of Normands to Section 22-3n-5e, Snowden Fee. Third probable location was in Section 3-2n-5e, Thompson Fee.

Paradis field, St. Charles Parish, was extended a mile west by The Texas Company's Louisiana Land & Exploration Company 4, completed for 1000 barrels daily at the 10,700-foot level which made Louisiana Land & Exploration Company 2, 1320 feet east of latest completion, the discovery. Sunset Realty Company 1, south extension attempt, was close to the sand at 10,200 feet.

R. H. Parker's Thompson 1, semi-wildcat in Section 87-13s-20e, a mile northeast of Paradis production, was shut down at 11,200 feet for orders.

The California Company has restored Delta Minerals 1, discovery well in the Stella field, Plaquemines Parish, to production after a series of workovers intended to abate salt water production. Latest gauge on flow from perforations at 9966 feet was 254 barrels of fluid hourly, with very little water.

Amerada Petroleum Company entered the Bayou Pigeon field, Iberia Parish, with location for State 1, Section 24-12s-1e, 800 feet southeast of the discovery, Plymouth Oil Company's McHugh Estate 1, now flowing 10 barrels daily from 8052 feet through 7/64-inch choke. This operator has an inactive location in the field in LeBlanc 1, east of the discovery. Shell Oil Company is expected to enter the development soon, as it holds extensive leases in the area.

Sun Oil Company has staked Kling & Wallet 2, Section 26-11s-8e, Fausse Point Dome, Iberia Parish, to confirm the new 1100-foot sand found on top of the dome by the company's Kling & Wallet 1. In the field, but on the dome flanks, The Texas Company and Sun

Oil Company have tests drilling at 6100 and 6000 feet, respectively.

Shell Oil Company's attempted east extension to Happytown, Iberia Parish, became doubtful as Schwing Lumber Company 1 reached 11,700 feet without a show. The discovery well, 1300 feet southwest, is producing from 9750 feet.

Humble Oil & Refining Company's Atkinson 1, South Crowley wildcat, in Acadia Parish, was drilling below 8300 feet, 1000 feet below the level which established the company's Finch 1 as a non-sustained producer four years ago. Information on shows, if any, and markers, was not made available. It is presumed that Atkinson 1 failed to log the 7300-foot objective sand.

## North Louisiana

### *Outpost to Shallow Olla Field Completed as Gasser*

Two miles south of production in the shallow Olla field, LaSalle Parish, H. L. Hunt's Louisiana Central Lumber Company 16, CNW NW 36-10n-2e, was completed for 15,000,000 cubic feet of dry gas daily after casing was perforated with 30 shots at 2224-34 feet. Unverified reports were that some oil appeared with the gas. Hunt also spudded a 4-mile north outpost, Louisiana 17, C NW SE 19-11n-3e.

In the same field, Arkansas Fuel Oil Company's Goodpine B-1, C NW NW 18-10n-3e, was completed flowing eight barrels of oil per hour through 1-inch choke after casing was perforated at 2212-16 feet and at 2228-32 feet in the Wilcox. Gas/oil ratio was 312 to 1. Hunt staked an offset location to Louisiana Central 16, the new test being in C SW NW 36-10n-2e.

Two wildcat locations were made in North Louisiana: W. A. Hardin, of Shreveport, will drill a deep test at Valentine 1, NW NW 31-20n-6w, Claiborne Parish, and H. L. Hunt located Ayers 1, C NW SW 18-15n-10e, a geophysical location in Madison Parish.

A northeast edge well in the Bodcaw sand at Cotton Valley, Webster Parish, was completed by H. L. Hunt at Robert Scott 1, C SE SE 19-21n-9w, logging Bodcaw sand at 8607-52 feet. It gauged 19 barrels per hour on ¼-inch choke with tubing pressure of 700 pounds, and casing pressure of 1600 pounds.

Noyes B. Livingston, of Shreveport, has assembled a block of 2200 acres just outside the old Dixie shallow field, Caddo Parish, and will spud a test by July in Section 36-20n-14w.

### *Louisiana Permits*

Fifty-four drilling permits were issued last week by the Louisiana Conservation Commission, of which 26 were in North Louisiana divided among the following parishes: Bossier, 1; Caddo, 18; Grant, 1; LaSalle, 2; Morehouse, 1; Sabine, 1; Tensas, 1; and Webster, 1.

Twenty-eight in South Louisiana were in the following parishes: Acadia, 1; Avoyelles, 3; Beauregard, 2; Calcasieu, 1; Cameron, 2; Evangeline, 4; Iberville, 1; Iberia, 2; Jefferson Davis, 1; Jefferson, 2; La Fourche, 7; St. Mary, 1; and Vermilion, 1.

## Arkansas

### *Lafayette County Wildcat Indicates Smackover Field*

Probability of a new deep Smackover lime oil field for South Arkansas was indicated last week when showings of oil and gas were logged in Atlantic Refining Company's Bodcaw Lumber Company 1, C NE SW 2917-23, LaFayette County, a geophysical wildcat prospect.

This test, which topped Smackover lime at 8995 feet (elevation 273 feet), in a core at 9102-14 feet recovered 7 feet of which 5.5 feet was soft porous oolitic lime with a good gas showing, the rest of the core being hard dense oolitic lime. In another core at 9114-25 feet, the top 7 feet were soft oolitic lime with gas showing, and the rest very soft lime showing oil, the gas-oil contact established at 9122 feet. Operators planned to cut one more core before running electric log and setting casing. Location is on a large block and just north of the company's holdings. Standard Oil Company of Louisiana has a large amount of acreage. If a new field, it will be the second deep field for Atlantic Refining Company in South Arkansas in the last year. The company drilled the discovery well in the Dorcheat field, Columbia County.

Standard Oil Company of Louisiana's A. W. Gunnels C-1, SE NW 20-17-19, east edge test in the Magnolia field, Columbia County, was completed at 7558 feet, gauging 135 barrels in first 7 hours, flowing through 11/64-inch choke. Casing pressure was 1175 pounds and tubing pressure 1050 pounds. Gas/oil ratio was 738/1. Standard Oil Company of Louisiana staked location for an offset. Completion of the new well leaves only one drilling operation, with three other active locations, including the one made last week.

Southeast 1½ miles of Standard Oil Company of Louisiana's Sturgis 1, CNE SW 1-17-27, which was coring hard lime at 9451 feet after topping Smackover lime at 9288 feet (elevation 346 feet), Red Iron Drilling Company abandoned as a dry hole without show in the Paluxy, Philyaw 1, NWc NE SE 7-17-26, Miller County. Total depth was 4302 feet. Standard Oil Company's Sturgis 1 has shown for an oil producer in the Paluxy.

Another wildcat abandonment was K. E. Jennings and J. and J. Oil Company's H. T. Wood 1, NE SW NE 33-18-28, Miller County, which also failed to pick up a showing in the Paluxy.

In Yell County, Edward C. Harvey spudded Carviness 1, SEC SE NE 30-3n-25w, a projected 3000-foot test being drilled with cable tools. It will be carried deeper if formations show promise.

### *Arkansas Permits*

Two drilling permits were issued last week by the Arkansas Oil & Gas Commission, as follows: Columbia County—Placid Oil Company's J. W. Booth B-1, C SE SE 19-17-19, and Union County—Standard Oil Company of Louisiana's D. A. Zimmerman 1, SE SW 29-18-16.


This Won't Interest You . . . Now!

Circumstances alter interests. A year ago you and I were not particularly concerned with national armament. Today, perhaps, we don't care where you buy supplies and equipment, and you are equally indifferent about what, how and who we sell. But it may be different tomorrow. We're trying to get acquainted in the abstract, if you please, so that if you ever do operate in our area you'll have one old friend with everything you need to get the job done . . . and you're welcome to it!

PELICAN WELL TOOL & SUPPLY CO.

SHREVEPORT LOUISIANA

PELCO

Houston
Greggton
Houma
New Iberia
Magnolia

## Mississippi

### *Pickens Gets Its Second Well; Outpost Looks Unfavorable*

The Pickens field, Yazoo County, added its second oil well last week, but another test in the Pickens area was not promising. The new producer is a south offset to the discovery. The second well is Exchange Oil Company's M. P. Wilburn 1, NE NE 31-12n-3e, completed at 4873 feet in 5 feet of oil sand, flowing 530 barrels in 9 hours through 2-inch tubing. At an elevation of 248 feet, it logged chalk at 3935-4350 feet, and topped the oil sand at 4868 feet.

Exchange Oil Company's Louise Dixon 1, SW SW 29-12n-3e, which topped the sand at 4987 feet (elevation 255 feet), ran a drill-stem test with seat at 4992 feet and recovered 1810 feet of salt water and 90 feet of mud in 20 minutes, with bottom at 5056 feet. The test cored from 5189 to 5194 feet and recovered one foot of sand, with no showing. It was to deepen from 5194 feet.

Wildcats were abandoned in Attala, Holmes and Humphreys counties.

After drilling to 5939 feet in Woodruff B-1, C SW NW 18-10n-2w, east edge test in the Tinsley Dome field, Union Producing Company abandoned it as non-productive in the Stevens and Woodruff sands. It was abandoned in red and gray shale and sand after electric log was run.

On the opposite side of the Tinsley Dome field, the same company's Friley A-2, NE SE 14-10n-3w, made a drill-stem test at 4902 feet with 3/8-inch chokes at top and bottom, and in seven minutes recovered 1850 feet of fluid, of which 728 feet was oil, 1030 feet oil and mud, and the rest mud. Seven-inch casing was cemented at 4966 feet, total depth being 4969 feet.

In Scott County, Exchange Oil Company's Newell Mineral Company 1, wildcat in NWc NE SW 30-7n-7e, after logging chalk at 3980-5101 feet, was coring below 5367 feet. In Tallahatchie County, Gulf Refining Company's T. P. Carson 1, wildcat in C NE 2-21n-1w, drilled below 3200 feet after topping chalk at 2570 feet, regarded as extremely high structurally. In Wayne County, Hill and Hill's Kalmia Realty 1, C SW NE 5-7n-9w, which topped chalk at 5141 feet, drilled broken chalk at 6202 feet.

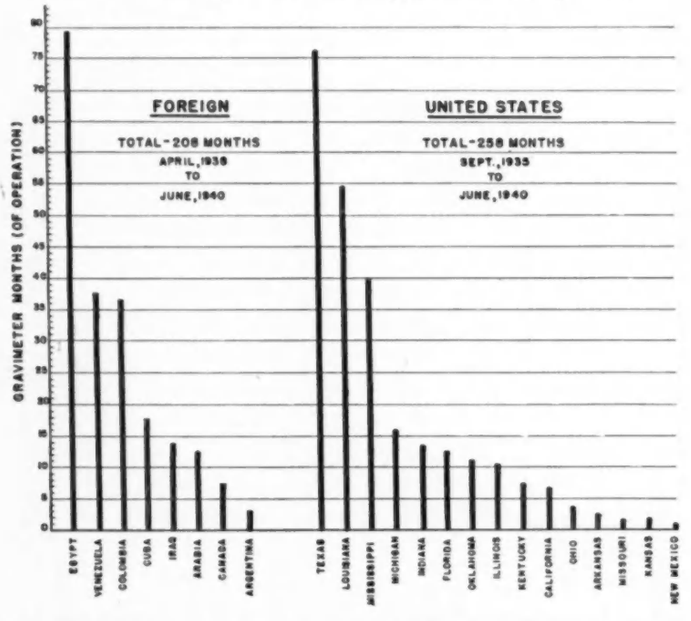
In Smith County, Haynes B. Ownby's School Board 1, NE NE SW 16-2n-9e, which topped Wilcox at 1800 feet, drilled in Midway below 5010 feet.

### *Moving East Texas Refinery To Mississippi Location*

Erection of a crude skimming plant at Yazoo City, Mississippi, to operate on oil produced in the nearby Tinsley field has been authorized by Edgar Johnston et al. Yazoo City has donated a tract for refinery site, and plans call for the removal of a 2500-barrel capacity plant that was formerly operated in the East Texas field by Model Oil & Refining Company, Kilgore, Texas.


**RECORD OF GRAVIMETER OPERATIONS**

More gravimeter months of operation than the combined total of all other exploration companies.




**MOTT-SMITH CORPORATION**

SHELL BLDG. HOUSTON, TEXAS


## Alabama

### *New Mobile County Test Raises Operations to Four*

Location for another test in southwest Alabama, where two of the state's three current drilling operations are located, was made last week. The new test is Plains Producing Company's Tom Daley 1, NWc SE SE 2-6s-4w, Mobile County, a projected 6500-foot test.

In Mobile County at Bayou Labatre, W. J. McCallahan's J. A. Stafford 1, SE NE SW 24-7s-3w, planned as an 8500-foot test, drilled shale below 6000 feet. A jeep run to 5603 feet showed a slight kick at 4560-70 feet. The following tops have been recorded. Hattiesburg, 450 feet; Jackson, 3400 feet; Claiborne, 3490 feet; Cook Mountain, 3576 feet; Cane River, 3815 feet; Wilcox, 4402 feet, and Midway, 5500 feet (estimated).

Union Producing Company's McCorvey 1, SE SW 20-9n-2w, Choctaw County, which with bottom at 9622 feet had set protective casing at 4038 feet, was deepening.

Leasing in western Alabama has shown a substantial increase recently. R. W. Williams, of Shreveport, has secured one-fourth mineral rights on 5500 acres of land in 9n-2w and 9n-3w, from Bolinger Lumber Company. H. E. Lillibridge, of Jackson, Mississippi, has leased over 4500 acres in 6n-2e, Clarke County and Union Producing Company is leasing in northeast Washington County and is completing a block in southeast Choctaw County.

A. D. Hunter, as representative of Humble Oil & Refining Company, asked the Mobile County Board of Commissioners for a 10-year lease on 17,400 acres of school lands.

In Mobile County, Joseph Canterbury has leased several hundred acres in 2n-3w and 2n-4w, Mobile County. In Franklin County, northwest Alabama, H. D. Easton, Jr., of Amory, Mississippi, leased several thousand acres on the Isabelle Structure around Section 12-7s-12w, for ten years. Seaboard Oil Company assigned Easton 1400 acres in the Johnson-Ford block in Marion and Lamar counties. Northwest of Mobile, there is considerable leasing in southeastern Wayne County, Mississippi.

J. Brian Eby, of Houston, has been acquiring leases for some time in Mobile County, 6 to 12 miles west of Mobile and for several months H. H. Sanders has leased in the same area. V. C. Perryman, of Dallas, has taken a number of leases in the same general area, all being in 4s-2w and 4s-3w. About two months ago, George W. Putnam and Ran M. Fox leased in that area. C. J. Davidson also leased in Mobile County, transferring his leases to J. Brian Eby. O. L. Hasty is also leasing in this county.

### *Revise Tank-Bottom Rule*

The rule governing disposal of tank bottoms has been revised by the Texas Railroad Commission to permit the director of production to make exceptions in special cases. Considerable difficulty has arisen recently concerning disposal of such bottoms in some fields where it was impossible to determine the origin of the oil.

# Rocky Mountain States

## *Confirmation Shannon-Sand Test for Cole Creek Reported*

General Petroleum Corporation's location of a Shannon-sand test in the Cole Creek field highlighted a week of several new starts. The company has let rotary contract for Government 21-31, CNW NE NW 21-35n-77w, a northeast offset to its recent Shannon sand discovery at Cole Creek. Government 21-1, CNW NW NW 21-35n-77w, was officially completed a week ago for 350 barrels flowing and pumping production of 35-gravity oil from 4530-70 feet. It had plugged back from 8050 feet after developing water in the Dakota-Lakota horizon. It is conservatively estimated that there are between 30 and 40 Shannon-sand 40-acre locations to drill at Cole Creek, and the company is expected to complete from six to eight wells before the close of the year.

The LaBarge field, Sublette County, southwestern Wyoming, another promised busy area for 1940 because of extensions tests which opened up several hundred acres north of former production, had two new starts last week. The Texas Company was rigging up standard tools for Government 1-G, NW NW SW 27-27n-113w, while Marvel Oil Company, which a week ago scored one of the largest completions to date in the shallow light oil field, was also rigging-up cable tools for Government 2-G, CNL NE SE 28-27n-113w. Worth Garretson et al spudded Fee 1, NE NW SE 28-27n-113w, ¼-mile west extension to LaBarge, located a week ago.

In the Lance Creek field, Argo Oil Corporation was running rig foundation for Ford 7, CSE NW SE 33-36n-65w, a first report. The Ohio Oil Company had a near completion in its Carrie Putnam 15, NW NE SW 33-36n-65w, which plugged back from 5541 feet in the second Leo where it had water to 5481 feet, and was testing 29 barrels of clean oil per hour from the first sand. The company's Carrie Putnam 16, SW SW NW 4-35n-65w, also encountered water in the lower Leo at 5529 feet, and plugged back to 5435 feet for water shut-off and completion.

The Ohio Oil Company is building rig for Anna Davis 3, NW SW NW 34-56n-97w, in the Garland field, Big Horn County, northern Wyoming. This test, a first report, is a south offset to the Mule Creek Oil Company's recently completed Sessions 1. In the old Rex Lake field, Carbon County, central Wyoming, the company was deepening Coughlin 1, SW NE NW 26-16n-77w, at 4500 feet for a first test of the Sundance sand in that field. The Sundance is expected within the next 100 feet of new hole. The well is an old Lakota producer deepening from 3936 feet.

A near completion in the Lost Soldier field, Sweetwater County, southwestern Wyoming, is Sinclair-Wyoming Oil Company's Lost Soldier 93-A, SW NW NW 11-26n-90w, which is drilling into Sundance objectives with cable tools at 1996 feet.

Gus Pomgratz et al's Clark 1, NE NE NE 22-19n-104w, north extension to the North Baxter Basin gas field and scheduled for a first test of the Tensleep sand, Sweetwater County, Wyoming, was rigging up rotary and preparing to spud. Red Desert Corporation's Edith Aspden 1, CNW SW NW 34-18n-103w, a southeast extension test of the Middle Baxter Basin field, also scheduled for the Tensleep, was waiting on rotary.

# California

## *Cantua Creek Test Looks Unfavorable at 10,000 Feet*

Latest effort to find commercial oil production north of the Coalinga extension area, Fresno County, apparently failed when The Texas Company's S. P. 1, wildcat in Section 23-17-15, in the Cantua Creek area, succeeded in making a strong blow of gas and three barrels of water per hour through a 2/64-inch bean with 500-pound tubing pressure and 1370-pound casing pressure. Gas output tapered off rapidly, however, and the hole was shut-in. Further testing is scheduled to be undertaken, but prospects of production are considered unfavorable.

Results are about the same as obtained by other prospect operations along the same trend. The test, bottomed at 10,116 feet, was plugged back to 9360 feet, with tests run 30 feet above plugged bottom. To the northwest in Section 29-14-13, Jergins Oil Company was plugging back Cheney Ranch 1 from 9345 feet to make final tests of showings between 7600 feet and the casing shoe at 6676 feet.

Elsewhere in the San Joaquin valley, four important tests were abandoned in the past week: Lindley C. Morton's Jewett 1 at Arvin, Oil Scout, Incorporated's Tejon Minerals 1 at Comanche Point, Shell Oil Company's B.V.A. 45-9 at Buena Vista Lake, and Union Oil Company's Fitzgerald-Weston 1 at Belridge. All were in Kern County, and the last three were deep tests for production in the Stevens zone.

A wildcat of Richfield Oil Corporation in the Tejon Ranch-Grapevine area, southern end of the San Joaquin Valley, Kern County, Section 2-10-19, has been taken to sufficient depth to attract speculative interest. Location for Tejon Ranch 1, was staked after extensive core-hole work. The company blocked out and leased over 50,000 acres in this district last year, and this is the first of six tests to be drilled in the area. It was drilling below 6172 feet in hard shale with streaks of sand. Streaks of basalt were encountered between 5628 and 6100 feet, together with shale.

After drilling and coring to 6025 feet, General Petroleum Corporation was abandoning K.P.C. 1, in the Semitropic area of Kern County, Section 16-26-22. Top of the Mulina was at 5210 feet. Formation test at 2710-2808 feet, 2820-3100 feet and at 3353-3405 feet recovered mud and salt water with a light blow of gas.

At Pyramid Hills in Kings County, Tide Water Associated Oil Company's West Slope 1, core-hole test in Section 20-24-18, bottomed at 2087 feet and plugged back to 950 feet, swabbed and bailed oil cutting a small amount of fresh water. It was being rigged to pump.

# Michigan

## *Four Wildcats Dry, But Two Shallow Areas Extended*

Four closely watched wildcat tests, three in the basin, drilled objective formations dry last week, but promising extension activity in two shallow pools aided in dispelling some of the gloom.

The three basin failures included Chapman Oil Company's Drier 1, Section 21-13n-5w, Fremont township, Isabella County, one of 11 attempts since 1930 to get Winn structure on production. The last test was 17 feet higher on the Dundee than the closest dry hole, and carried two saturation zones before going into water at 3568 feet for abandonment.

Sun Oil Company, now leading all in-individual wildcat efforts in Michigan, major or independent, drilled State A1, Section 4-20n-3w, Clare County, dry to 4298 feet. It was the second recent deep test by Sun in North Central Michigan where the company has closely held blocks of thousands of acres in the Roscommon, Clare, Osceola and Gladwin County district. The company had five other basin wildcats drilling, and last week announced a location to be drilled with Pure Oil Company in Section 8-19n-6w, Redding Township, Clare County.

The third basin failure was registered in Ogemaw County, Rose City area, by Weber Oil Company on State 1, Section 25-24n-1e, a 2990-foot Dundee-lime test.

Dr. S. J. Higelmire, discoverer of the Temple pool, Clare County, in 1938, drilled Haney 1, Section 33-9n-16w, Fruitport Township, Muskegon County, dry. It was a 2250-foot Traverse-lime test.

Promising extension work was in sight to both the Grand Rapids and Overisel-Heath pools, both Traverse bed producers, after several nice completions which pushed previous producing limits farther out.

C. L. Maguire's Clark 1, Section 32-16n-2w, Midland County wildcat, was brought up the hole 40 feet when 5-inch casing was set preparatory to drilling out the Sylvania sand. The corrected measure, placing bottom at 4941 feet, indicated another week before the objective sand would be tested. The operator's test will be the first to reach this formation in the basin in 22 months. Already, despite the correction, it is the deepest since mid-1938 on actual footage.

An innovation in Michigan expected to be closely watched is the starting by C. W. Teater, of Saginaw, veteran Michigan independent who drilled the Porter discovery in 1933, of a 5-spot test in the North Buckeye pool, Gladwin County. Teater spudded Domokos 9, C SW NW Section 11-18n-1w, Buckeye township, the location being in the approximate center of four 3600-foot Dundee oil wells on regular 10-acre locations, in one of the more prolific areas of the field. The four original wells were completed in 1937, ranging in initial production from 1200 to 3600 barrels per day. It is the first 5-spot location for an old field developed on a 10-acre pattern ever made in Michigan.

# UNITED STATES WELL COMPLETIONS

## Arkansas

**Columbia County (Magnolia)—**

| Company, Well and Location | Init. Prod. Bbls. | Depth |
|---|---|---|
| Standard Oil Co. of La., Gunnels C-1, 20-17-19 | 450 | 7558 |

**Miller County (Wildcats)—**

| | | |
|---|---|---|
| K. E. Jennings et al, Wood 1, 33-18-28 | * | 4562 |
| Red Iron Drlg. Co., Philyaw 1, 7-17-26 | * | 4302 |

## California

**Fresno County (Coalinga Northeast)—**

| | | |
|---|---|---|
| Standard, No. 53-19B | 2437 | 8276 |
| Superior, Husong 5 | 1162 | 8245 |

**Fresno County (Coalinga Eocene)—**

| | | |
|---|---|---|
| Superior, Cagle B-3 | 1240 | 8228 |

**Fresno County (Coalinga Shallow)—**

| | | |
|---|---|---|
| Shell, No. 45-2 | 456 | 3745 |

**Kern County (Arvin Area)—**

| | | |
|---|---|---|
| Lindley C. Morton, Jewett 1 | * | 6680 |

**Kern County (South Belridge)—**

| | | |
|---|---|---|
| Union, Fitzgerald-Weston 1 | * | 7493 |

**Kern County (Buena Vista)—**

| | | |
|---|---|---|
| Shell, BVA 45-9 | * | 12,027 |

**Kern County (Comanche Point)—**

| | | |
|---|---|---|
| Oil Scout, Inc., Tejon Minerals 1 | * | 7008 |

**Kern County (Edison)—**

| | | |
|---|---|---|
| Monterey Exploration Co., Shell-Duff 15 | 44 | 1731 |

**Kern County (Greeley)—**

| | | |
|---|---|---|
| General Petroleum, Oughton 1 | 1296 | 11,510 |

**Kern County (Kern River)—**

| | | |
|---|---|---|
| Helm & Smith, H&S 20 | 5 | 695 |
| H&S 22 | 5 | 650 |

**Kern County (McKittrick)—**

| | | |
|---|---|---|
| Franco-Western Oil Co., No. 19 | 57 | 981 |

**Kern County (Mt. Poso)—**

| | | |
|---|---|---|
| Bishop Oil Co., No. 3 | 150 | 1605 |

**Kern County (Rio Bravo)—**

| | | |
|---|---|---|
| Superior, Burner 3 | 1478 | 11,410 |

**Kern County (Strand)—**

| | | |
|---|---|---|
| Shell, KCL B-86-12 | 2227 | 8499 |

**Kern County (Ten Sections)—**

| | | |
|---|---|---|
| Shell, KCL B-41-31 | 2960 | 8220 |

**Kern County (Wasco)—**

| | | |
|---|---|---|
| Continental Oil Co., KCL A-5 | 875 | 13,158 |

**Kings County (Kettleman Hills)—**

| | | |
|---|---|---|
| K. N. D. A., No. 4-16Q | 894 | 8230 |
| Standard, No. 41-35-Q | 633 | 8305 |

**Los Angeles County (Dominguez)—**

| | | |
|---|---|---|
| R. E. Havenstrite, Larronde 3 | 800 | 7541 |
| Union, Austin 1 | 1200 | 7480 |

**Los Angeles County (Long Beach)—**

| | | |
|---|---|---|
| Cal-Mac Oil Co., Oil Exchange 3 | 110 | 3399 |

**Los Angeles County (Montebello)—**

| | | |
|---|---|---|
| Herley-Kelley Oil Operators, Masser 2 | No Est. | 7740 |
| Kern Oil Co., Eggleston 3 | 960 | 7800 |
| Mulholland 5 | 404 | 7770 |
| McIvar & Rood, Manz 2 | 380 | 7760 |
| Standard, Braun 7 | 1603 | 7797 |

**Los Angeles County (Rosecrans-Athens)—**

| | | |
|---|---|---|
| Howard Oil Co., H. O. 2 | 100 | 7650 |
| St. Anthony Oil Corp., Gordon 3 | 1200 | 7750 |

**Los Angeles County (Seal Beach)—**

| | | |
|---|---|---|
| Continental Oil Co., Bixby 43 | 680 | 4393 |

**Los Angeles County (Wilmington)—**

| | | |
|---|---|---|
| Caminol Co., Comm. 1 | 145 | 3630 |
| Hancock Oil Co., Harbor C-24 | 64 | 4192 |
| Long Beach Oil Dev. Co., "W" 12 | 376 | 3947 |
| Royalty Service Corp., Heaton 1 | 250 | 3635 |
| V. R. G. Wilbur, Mutual 3 | No Est. | 3579 |

**Orange County (Puente Hills)—**

| | | |
|---|---|---|
| E. F. Stella, Trustee, McDermont 1 | 9 | 1050 |

**Ventura County (San Miguelito)—**

| | | |
|---|---|---|
| Continental Oil Co., Grubb 16 | 1165 | 6610 |

**Ventura County (Ventura Avenue)—**

| | | |
|---|---|---|
| Shell, Taylor 118 | 3656 | 7700 |

## Illinois

**Clay County—**

| | | |
|---|---|---|
| Pure, Gill 2, ce½ ne ne 21-2n-8e | 15 | 3105 |
| W. C. McBride, Landreth 1, c nw nw ne 27-5n-5e | * | 2400 |

**Clinton County—**

| | | |
|---|---|---|
| I. W. Lee, Hanseman 1, sw se sw se 1-1n-1w | 730 | 2916 |
| Ring & MacLean, Hanseman 1, cwl sw se se 1-1n-1w | 725 | 2912 |
| Carl Ewing, Kohl 1, lots 8 & 9, blk 4, 12-1n-1w | 190 | 2918 |
| Fairhope Oil Co., Allison 2, nec sw ne 12-1n-1w | 950 | 2918 |
| Barth 3, sw ne se sw 12-1n-1w | 336 | 2928 |
| Bert Fields, Allison 1, nwc ne ne 12-1n-1w | 769 | 2923 |
| Allison 2, swc ne ne 12-1n-1w | 896 | 2925 |
| Etheridge, Seigler 2, nwc ne se 12-1n-1w | 528 | 2920 |
| Gulf, Buehler 18, ne nw sw ne 12-1n-1w | 2079 | 2929 |
| W. C. McBride, Allison 10, nwc se ne 12-1n-1w | 1275 | 2929 |
| Penn, Ohl 1, se ne ne se 12-1n-1w | 240 | 2925 |
| Ring, Loyd 1, nw sw ne se 12-1n-1w | 280 | 2911 |
| L. Simmell, Kaelin Est. 3, ne nw sw se 12-1n-1w | 121 | 2918 |
| Smokey Oil Co., Allison 2, se sw nw se 12-1n-1w | 200 | 2914 |
| Allison 4, se nw nw se 12-1n-1w | 646 | 2923 |
| Thompson Dr. Co., Hanseman 3, nec nw ne 12-1n-1w | 720 | 2920 |
| Hanseman 4, sec nw ne 12-1n-1w | 960 | 2920 |
| Hanseman 5, sw se nw ne 12-1n-1w | 1080 | 2924 |
| A. F. Anding, Siegler 2, nec ne 13-1n-1w | 310 | 2915 |

**Crawford County—**

| | | |
|---|---|---|
| LaSalle Dr. Co., Berryhill 1, ne ne nw 9-6n-13w | 12½ | 1903 |

**Edwards County—**

| | | |
|---|---|---|
| Superior, Woods 3, sw nw nw 19-2s-11e | 144 | 2374 |

**Fayette County—**

| | | |
|---|---|---|
| Texas, Neathery 4, se ne nw 6-6n-3e | 140 | 1562 |
| Feinberg et al, Townsend 1, se ne nw 13-7n-2e | * | 1573 |
| Carter, Minnie Doty 1, sw se nw 2-8n-3e | 60 | 1580 |
| Taylor 4, sw nw se 12-8n-3e | 72 | 1528 |
| Doty 2, ne se nw 13-8n-3e | 984 | 1535 |
| Stead 6, nw nw nw 13-8n-3e | 372 | 1540 |
| Rickett 4, ne ne ne 14-8n-3e | 528 | 1530 |
| Ping 2, sw sw ne 16-8n-3e | 76 | 1537 |
| Rhodes 2, se sw sw 23-8n-3e | 336 | 1530 |
| Durbin 8, se se se 28-8n-3e | 438 | 1586 |
| Weaber 4, nw nw 28-8n-3e | 66 | 1485 |
| Whisenant, Lilly 16, ne nw se 16-8n-3e | 150 | 1501 |
| Lilly 17, ne nw se 16-8n-3e | 500 | 1580 |

**Hamilton County—**

| | | |
|---|---|---|
| Kingwood, Dodd 2, ne se nw 6-6s-7e | 720 | 2719 |

**Lawrence County—**

| | | |
|---|---|---|
| Dorsey, Clark 1, ne se ne se 3-2n-12w | 29 | 650 |
| Hupp et al, French 1, se ne se 33-2n-13w | * | 2768 |
| Bell Bros., Wampler 1, nw se se ne 27-5n-11w | * | 3262 |

**Marion County—**

| | | |
|---|---|---|
| A. M. Carey, Ragsdale 1, swc nw 7-1n-1e | 90 | 2935 |
| E. Frank Jones, Heed 1, nwc sw sw 7-1n-1e | 350 | 2922 |
| Oil Producers, Marchall 1, nw ne sw sw 18-1n-1e | 258 | 2904 |
| Ohio, Murray 14, ne nw sw 7-1n-2e | 140 | 2100 |
| Rockhill, Foster 18, sw se se 7-1n-2e | 950 | 2098 |
| Texas, Hawthorne 30, ne se sw se 5-1n-2e | 84 | 2070 |
| Canull 15, w½ se ne 6-1n-2e | 400 | 1810 |
| Martin 10, sw se se 17-2n-2e | 126 | 2065 |
| Sweney 8, se ne sw nw 20-2n-2e | 982 | 3504 |
| Chapman 17, nw ne sw 28-2n-2e | 300 | 3475 |
| Friedrich 20, nw sw nw 29-2n-2e | 1020 | 3484 |
| Maxwell 8, sw se ne se 30-2n-2e | 1704 | 3421 |
| Hopkins 8, nec se 31-2n-2e | 1675 | 3330 |
| Stroup 14, nw ne se nw 31-2n-2e | 2220 | 3400 |
| Richardson 17, nec sw 32-2n-2e | 970 | 3390 |
| Richardson 19, sw se sw nw 32-2n-2e | 1470 | 3350 |
| Richardson 20, swc nw 32-2n-2e | 600 | 3345 |

## Summary of Drilling Operations in the United States, Week Ended June 1, 1940

| | WELLS COMPLETED | | | | | | | PERMITS FOR NEW WELLS* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Completions | Oil Wells | Gas Wells | Failures | Initial Production | Total 1940 | Total this Date 1939 | This Week | Total this Month | Total 1940 | Total this Date 1939 | Year Total 1939 |
| Alabama | ..... | ..... | ..... | ..... | ..... | ..... | 1 | ..... | ..... | ..... | ..... | ..... |
| Arizona | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Arkansas | 3 | 1 | ..... | 2 | 450 | 82 | 95 | 2 | 18 | 60 | 94 | 223 |
| California | 39 | 35 | ..... | 4 | 29,021 | 577 | 455 | 17 | 131 | 482 | 444 | 1,174 |
| Colorado | ..... | ..... | ..... | ..... | ..... | ..... | 11 | ..... | ..... | ..... | ..... | ..... |
| Florida | ..... | ..... | ..... | ..... | ..... | 3 | ..... | ..... | ..... | ..... | ..... | ..... |
| Georgia | ..... | ..... | ..... | ..... | ..... | ..... | 1 | ..... | ..... | ..... | ..... | ..... |
| Illinois* | 86 | 76 | ..... | 10 | 50,850 | 1,526 | 1,563 | 118 | 490 | 1,771 | ..... | 893 |
| Indiana | 7 | 1 | 1 | 5 | 20 | 163 | 61 | ..... | ..... | ..... | ..... | ..... |
| Kansas | 53 | 37 | 1 | 15 | 67,023 | 746 | 527 | 55 | 234 | 857 | 609 | 1,583 |
| Kentucky | 11 | 5 | ..... | 6 | 150 | 109 | 269 | ..... | ..... | ..... | ..... | ..... |
| Louisiana | 28 | 26 | 1 | 1 | 10,079 | 679 | 421 | 54 | 221 | 708 | 511 | 1,444 |
| Michigan | 36 | 22 | 2 | 12 | 4,101 | 542 | 549 | 14 | 101 | 501 | 520 | 1,419 |
| Mississippi | 7 | 3 | ..... | 4 | 2,280 | 80 | 2 | ..... | ..... | ..... | ..... | ..... |
| Missouri | ..... | ..... | ..... | ..... | ..... | 6 | ..... | ..... | ..... | ..... | ..... | ..... |
| Montana | 5 | 5 | ..... | ..... | 470 | 68 | 46 | ..... | ..... | ..... | ..... | ..... |
| Nebraska | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| New Mexico* | 9 | 7 | ..... | 2 | 2,839 | 323 | 263 | 8 | 72 | 308 | ..... | 293 |
| New York | 18† | 18† | ..... | ..... | 71 | 460 | 200 | ..... | ..... | ..... | ..... | ..... |
| North Dakota | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Ohio | 52 | 21 | 19 | 12 | 349 | 349 | 341 | ..... | ..... | ..... | ..... | ..... |
| Oklahoma | 39 | 23 | 3 | 13 | 5,196 | 934 | 871 | 40 | 188 | 838 | 900 | 2,059 |
| Pennsylvania | 66† | 58† | 7 | 1 | 68 | 1,126 | 528 | ..... | ..... | ..... | ..... | ..... |
| South Dakota | ..... | ..... | ..... | ..... | ..... | 1 | ..... | ..... | ..... | ..... | ..... | ..... |
| Tennessee | ..... | ..... | ..... | ..... | ..... | 3 | ..... | ..... | ..... | ..... | ..... | ..... |
| Texas | 188 | 153 | 5 | 30 | 89,327 | 4,466 | 4,171 | 378 | 1,365 | 5,443 | 4,573 | 10,269 |
| Utah | ..... | ..... | ..... | ..... | ..... | 1 | ..... | ..... | ..... | ..... | ..... | ..... |
| West Virginia | 11 | 1 | 10 | ..... | 5 | 237 | 204 | ..... | ..... | 127 | ..... | 718 |
| Wyoming | 4 | 4 | ..... | ..... | 2,362 | 59 | 60 | ..... | ..... | 1 | ..... | ..... |
| Total this week | 662 | 496 | 49 | 117 | 264,661 | 12,540 | 10,639 | 686 | 2,820 | 11,096 | 7,651 | 20,075 |
| Total last week | 669 | 476 | 44 | 149 | 213,135 | 11,878 | 10,121 | 424 | 2,135 | 10,410 | 7,285 | 20,075 |
| Total this year | 12,540 | 9,199 | 682 | 2,659 | 4,802,686 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

* This tabulation includes those states where weekly data are available; figures for Illinois date from October 15, 1939: New Mexico from August 1, 1939.
† Includes water input wells.

# United States Well Completions—*Continued*

| Company, Well and Location | Init. Prod. Bbls. | Depth |
|---|---|---|
| Richardson 21, nw sw ne sw 32-2n-2e | 1453 | 3405 |
| Stonecipher 15, se nw se sw 32-2n-2e | 2767 | 3418 |
| Williams 19, sw nw sw 32-2n-2e | 2000 | 3340 |
| Williams 20, sec nw sw, 32-2n-2e | 1400 | 3381 |
| Buckley 7, cs½ nw se 33-2n-2e | 455 | 2100 |
| Easley 17, sw nw se nw 33-2n-2e | 1654 | 3512 |
| Baldwin, West Nation School 2, swc ne 33-2n-2e | 1800 | 3546 |
| Southwest O. & G., Stein 12, se se se 5-2n-1e | 450 | 2967 |
| Blackstock, M & I RR 3-C, sw se nw 20-2n-2e | 200 | 1890 |
| Kingwood-Bell, Shanafelt 24, nw ne ne 20-2n-2e | 1128 | 3439 |
| Magnolia, Shanafelt 35, sw nw nw nw 21-2n-2e | 691 | 3512 |
| Young 104, sw se nw sw 21-2n-2e | 1176 | 3505 |
| Young 105, ne sw sw 21-2n-2e | 2205 | 3522 |
| **Monroe County—** | | |
| Chas. T. Judd, Kolmer 2, ne se se nw 24-2s-10w | * | 530 |
| **Richland County—** | | |
| Bowman, Lawless 2, se sw 18-4n-10w | * | 1650 |
| N. V. Duncan, Schilling 1, se se se 32-4n-9e | 540 | 2650 |
| Pure, Wachtel 6, ce½ ne sw 6-4n-10e | 265 | 2918 |
| **Shelby County—** | | |
| Werner & Dudley, Prosser 1, s½ sw ne 25-10n-4e | * | 1979 |
| **Wabash County—** | | |
| Mabee Dr. Co., Bump 7, se se sw 4-2s-13w | 9 | 2424 |
| Bartlett et al, Stansfield 5, ne se se 19-2s-13w | 266 | 2463 |
| Longhorn, Hall 6, swc sw 7-3s-13w | 125 | 2514 |
| **Wayne County—** | | |
| H. Scott, Flanders 1, nw nw ne 3-2s-7e | 480 | 3243 |
| **White County—** | | |
| New Penn Oil Co., French 1, se nw sw nw 20-3s-8e | 193 | 3251 |
| Leo Horton, Schoemann 1, sw se sw 35-3s-9e | * | 3520 |
| Sun, Ford 1, nw ne ne 18-5s-14w | * | 3144 |
| Carter, Orval Pool 5, sw se se 24-6s-8e | 58 | 2528 |
| Vineyard 1, sw se ne 21-7s-8e | * | 3165 |
| Bowers & Johnston, Storms 1, nw ne se ne 22-6s-9e | 120 | 2264 |
| Skelly, Storms 5, ne nw sw 14-6s-9e | 399 | 2258 |

## Indiana

| | | |
|---|---|---|
| **Greene County—** | | |
| Yandell Rogers et al, Miller 1, sec sw 32-6s-7w | * | 1060 |
| **Knox County—** | | |
| Sun, Utt 1, c 182-4n-9w | * | 3252 |
| **Posey County—** | | |
| Paul Rossi, Pendell 1, sw se se 30-6s-12w | * | 2810 |
| Nash Redwine, Woods Comm. 1, ne sw sw 1-7s-12w | 20 | 1909 |
| **Spencer County—** | | |
| Gulf Ref., Axton 1, se se nw 30-7s-6w | 12.9 | 895 |
| **Sullivan County—** | | |
| O. A. Thayer et al, Crowder 1, se sw sw 3-7n-9w | * | 830 |
| **Warrick County—** | | |
| Harry Appell, Thomas 1, nwc se ne 12-7s-8w | * | 1065 |

## Kansas

| | | |
|---|---|---|
| **Barton County—** | | |
| Shell, Bitter "B" 11, csl sw nw se 6-16-13w | 2051 | 3352 |
| Luerman 3, cwl nw ne sw 18-16-13w | 721 | 3368 |
| Phillips, Bitter 5, cwl sw se ne 6-16-13w | 2990 | 3348 |
| Petz 2, ce½ sw ne 7-20-11w | 2061 | 3332 |
| Stanolind, Rose 7, csl sw nw ne 3-20-11w | 53 | 3321 |
| Lario, Zahorsky "A" 4, cn½ nw ne 23-20-11w | 3000 | 3286 |
| I. T. I. O., Schrapel 6, cwl nw ne ne 26-20-11w | 3000 | 3265 |
| **Butler County—** | | |
| Janney et al, Smitherman 1, nw se nw 16-26-5e | 5 | 1670 |
| Rex et al, Sutter 4, cwl sw ne se 7-28-7e | 35 | 2649 |
| **Cloud County—** | | |
| Lindsay et al, Leblanc 1, cs½ sw nw 35-6s-1w | * | 3407 |
| **Cowley County—** | | |
| Brewer et al, Starket "C" 1, se sw se 16-30-4e | * | 2793 |
| Falkingham 1, cn½ nw se 22-30-4e | * | 3336 |
| Carlock et al, Starkey 1, cs½ se se 21-30-7e | * | 3194 |
| Wakefield et al, Dunn 1, cw½ se nw 3-35-5e | * | 3123 |
| **Ellis County—** | | |
| Darby, Henderson 6, cn½ sw nw 7-11-17w | 3000 | 3397 |
| Lario, Pearl 3, cw½ sw se 13-11-17w | 3000 | 3394 |
| Bay Petroleum, Riddler "A" 2, ce½ ne ne 12-11-18w | 3000 | 3444 |
| Shell, Riddler "A" 1, se sw nw 12-11-18w | 3000 | 3383 |
| **Ellsworth County—** | | |
| Magnolia, Skalicky 1, cw½ sw sw 4-16-10w | * | 3307 |
| Gulf, Malir 1, nw swc ne 16-16-10w | 3000 | 3322 |
| Mabee et al, Horejsi 1, cs½ sw ne 17-16-10w | * | 3404 |
| Phillips et al, Horejsi 2, ce½ ne ne 17-16-10w | 499 | 3400 |
| Stanolind et al, Stoltenberg "D" 1, cs½ sw ne 27-16-10w | 3000 | 3285 |
| Skelly, Zink 7, ce½ se sw 32-17-10w | 2751 | 3222 |
| **Greenwood County—** | | |
| Barbara, Schneider 15, csl se nw nw 10-23-13e (OTD 1638) | 200 | 1789 |
| Weideman, Templer 1, sec nw 25-27-8e (OTD 2515) | 6 | 2774 |
| Lewis et al, Gladston 1, se sw nw ne 17-28-11e | 45 | 1123 |
| **Kingman County—** | | |
| Skelly, Miles "B" 7, cse 19-27-10w | 149.5 | 3997 |
| **Leavenworth County—** | | |
| Wamhoff et al, Maduska 1, cse ne 36-8n-20e | * | 1505 |
| **McPherson County—** | | |
| Central Pet. et al, Swanson "B" 1, cn½ sw nw 19-20-5w | 2540 | 3323 |
| Continental, Knackstedt 2, cs½ se nw 30-20-5w | 3000 | 3333 |
| **Phillips County—** | | |
| Hess et al, Kincade 1, cw½ nw nw 30-5-17w | * | 3435 |
| **Reno County—** | | |
| Westgate-Greenland, Schlickau 1, cw½ se sw 8-25-4w | * | 3613 |
| **Rice County—** | | |
| Holl et al, Wilkens 1, se nwc ne 28-18-6w | * | 3514 |
| Derby et al, Munroe 1, cw½ nw se 26-18-9w | * | 3330 |
| Jones et al, Heinz 1, ce½ ne se 28-18-10w | * | 3320 |
| Bishop, Cramm 3, se ne sw 15-19-9w | 229 | 3206 |
| Skelly, McQuire 4, cn½ se ne 34-19-10w | 1841 | 3311 |
| McBride, Hodge 3, cs½ ne ne 25-20-6w | 160 | 3357 |
| Hall et al, Warner 1, se sw nw 15-20-10w | 2063 | 3450 |
| Kauffman, Hayes 1, cn½ ne ne 25-21-7w | * | 3501 |
| **Russell County—** | | |
| Stanolind, Krug "B" 5, cw½ nw se 27-14-14w | 1630 | 3045 |
| Roesner 8, cs½ nw se 9-15-13w | 1576 | 3155 |
| Coralena, Dietz 1, cw½ sw nw 28-15-13w | 1056 | 3340 |
| Dumler 9, cwl sw se nw 36-15-14w | 2298 | 3321 |
| Skelly, Meidens 13, cwl nw se se 32-15-13w | 3000 | 3323 |
| Cities Service, Bender "A" 10, cs½ sw nw 25-15-14w | 1401 | 3321 |
| Shell, Dumler 10, sw nw sw 36-15-14w | 3000 | 3321 |
| **Stafford County—** | | |
| Stanolind, Spangenberg 6, ce½ nw sw 29-22-11w | 3000 | 3567 |
| Helmers 1, csl sw ne nw 1-22-12w | 499 | 3568 |
| Sims 5, cs½ ne ne 11-24-11w | 1313 | 3778 |
| W-K Royalty, Equitable Life 1, ce½ se ne 15-24-11w | 3000 | 3832 |
| **Woodson County—** | | |
| Cooper, Sowder 1, sec nw 31-25-14e | * | 1600 |

## Kentucky

| | | |
|---|---|---|
| **Butler County—** | | |
| W. Phillips et al, Gardner Hrs. 1 | 10 | 411 |
| **Daviess County—** | | |
| A. V. Smith et al, Cravens 2 | * | 1849 |
| Sargent et al, Westerfield 6 | * | 1731 |
| H. C. Farmer, Fitts 1 | 50 | 1000 |
| Nation 5 | 25 | 1391 |
| **Hancock County—** | | |
| John Richards et al, McGavock 1 | 25 | 500 |
| **McCracken County—** | | |
| Pascal Pass, Sheppard 1 | * | 2013 |
| **McLean County—** | | |
| M. L. Schwartzburg, Davis 1 | * | 1806 |
| **Ohio County—** | | |
| H. C. Ames et al, Gray 3 | * | 250 |
| Mecca Oil Co., Cullin 3 | * | 491 |
| Dehart & Likens, Bartlett Hrs. 7 | 40 | 474 |

## South Louisiana

| | | |
|---|---|---|
| **Anse La Butte—** | | |
| Glassell & Glassell, Breaux A-2 | 129 | 4699 |
| Patin 1 | 327 | 4750 |
| Stanolind, Bergeron 1 | 500 | 4680 |
| **Cheneyville—** | | |
| Amerada, Weil 9 | 308 | 5785 |
| **Eola—** | | |
| Amerada, Cerami 4 | 645 | 8570 |
| Gulf, Moliere 3 | 535 | 8560 |
| Richardson, Haas Investment 12 | 758 | 8575 |
| **Gibson—** | | |
| Shell, Pelican 8 | 901 | 9467 |
| **Golden Meadows—** | | |
| Bennett, Gilbeau 1 | 216 | 5147 |
| Mar-Tex, Rebstock B-3 | 109 | 5545 |
| Texas, La Terre 7 | 122 | 5649 |
| **Grand Lake—** | | |
| Amerada, State-Mallard Bay 10 | 264 | 8950 |
| **New Iberia—** | | |
| Hells Jr., Bolivar H-1 | 114 | 1892 |
| Texas, Duhe 17 | 275 | 6000 |
| **Jennings—** | | |
| Port City, Syndicate Fee 25 | 50 | 2444 |
| **Paradis—** | | |
| Texas, LL&E 4 | 900 | 10,380 |
| **Port Barre—** | | |
| Pan-American, Garland 6 | 650 | 6090 |
| **South Roanoke—** | | |
| Shell, Sturdivant 4 | 160 | 9950 |
| **University—** | | |
| Sugar Field, Richard 3 | 216 | ... |
| **Ville Platte—** | | |
| J. K. Hughes, Ortego 2 | 599 | 9875 |
| **West Hackberry—** | | |
| Superior, Vincent 10 | 388 | 7700 |
| **West Lake Verrett—** | | |
| Shell, Jeanerette Lbr. Co. 4 | 255 | 8020 |
| **White Castle—** | | |
| Shell, Wilbert 16 | 366 | 6385 |
| **Iberville Parish—** | | |
| Shell, Southwood Plant 1, San Gabriel area | * | 7308 |

## North Louisiana

| | | |
|---|---|---|
| **La Salle Parish (Olla)—** | | |
| Arkansas Fuel Oil Co., Goodpine B-1, 18-10n-3e | 192 | 2232 |
| H. L. Hunt, La. Cent. Lbr. Co. 16, 36-10n-2e | ¶15.00 | 2319 |
| **Webster Parish (Cotton Valley)—** | | |
| H. L. Hunt, Robt. Scott 1, 19-21n-9w | 450 | 8689 |
| Mid-States Oil Corp., Brenner-Beamsley Unit 1, 20-21n-10w | 650 | 8624 |

## Michigan

| | | |
|---|---|---|
| **Allegan County—** | | |
| Fletcher & Lemans, Nevenzel 2, sw nw sw 3-3n-14w | 150 | 1442 |
| Van Sweden 2, sw ne se 4-3n-14w | 800 | 1445 |
| Red-Man Oil Co., Brower 2, ne sw nw 3-4n-13w | 45 | 1498 |
| Wiser Oil Co., Klein 2, ne nw se 4-3n-13w | 140 | 1508 |
| Frank S. Vahue, Klein 2, ce sw nw 10-3n-13w | 50 | 1519 |
| Jacob Bolema, Voorhorst 1, nw nw se 34-4n-14w | 100 | 1435 |
| Salem G. & O. Co., Gaca 4, ne nw sw 14-4n-13w | 200 | 1586 |
| Universal Oil Co., Sutter 1, sw nw se 14-4n-13w | * | 1625 |
| **Calhoun County—** | | |
| Alfred Morency, Platz 1, ne nw se 3-4s-7w | * | 1410 |
| **Clare County—** | | |
| Sun, State A1, cs sw sw 4-20n-3w | * | 4298 |
| Switzer 1, c ne 27-19n-3w | * | 1330 |
| Taggart Brothers, Mercier 26, c ne 27-18n-5w | ¶.50 | 1559 |
| Powers 25, c ne 28-18n-5w | ¶.50 | 1555 |
| Pure, Bicknell B16, cn sw ne 28-19n-6w | 75 | 3888 |
| Bicknell A3, cn ne ne 34-19n-6w | 350 | 3913 |
| American Dr. Co., State K2, cs sw ne 32-19n-6w | 80 | 3876 |
| **Isabella County—** | | |
| Chapman Oil Co., Dreier 1, ce ne ne, 21-13n-5w | * | 3568 |
| Gulf, Reed B2, nw nw nw 16-16n-3w | 278 | 3746 |
| McClanahan & Whites, Nixon 3, nw sw se 17-16n-3w | 450 | 3747 |
| Cities Service, Tubbs 2, se nw se 17-16n-3w | 308 | 3720 |
| **Kent County—** | | |
| R. E. King, Walsh 1, se ne ne 31-7n-12w | 13 | 1179 |
| Certainteed Prod. Co., Fee 17, ne ne se 33-7n-12w | 195 | 1889 |
| **Midland County—** | | |
| C. M. Carrouther, Kleinhans 1, sw sw ne 2-13n-1w | * | 3545 |
| Pure, Naramore 30, cn ne nw 15-13n-1w | 150 | 3415 |
| **Muskegon County—** | | |
| Dr. S. J. Higelmire, Haney 1, nw sw se 33-9n-16w | * | 2250 |
| **Ogemaw County—** | | |
| Weber Oil Co., State 1, cw ne ne 25-24n-1e | * | 2990 |
| **Ottawa County—** | | |
| Freeman Oil Co., Kleis 1, nw nw nw 26-5n-15w | * | 1615 |
| Mesel & Spielbergs, Lipski 2, se ne sw 14-7n-13w | 250 | 1856 |
| American Dr. Co., Snip 1, ne sw nw 23-7n-13w | 90 | 1890 |
| Smith Pet. Co., White 1, s½ se nw 23-7n-13w | 212 | 1876 |
| Basin Oil Co., Connell B3, nw se se 24-7n-13w | 110 | 1926 |
| Nelson Dev. Co., Thome 1, sw nw nw 24-7n-13w | 40 | 1890 |

[*Continued on next page*]

# United States Well Completions—*Continued*

## MICHIGAN—Continued

**Van Buren County—**

| Company, Well and Location | Init. Prod. Bbls. | Depth |
|---|---|---|
| McLean, Ulrath 1, nw se sw 21-2s-16w | 15 | 1003 |
| R. T. & E., Clinkenbeard 5, ne sw nw 17-1s-14w | * | 1300 |
| Westbrook Dr. Co., Mulhall 1, sw se sw 4-1s-15w | * | 1185 |
| Godfrey & Hoslers, Robbins 1, sw se nw 19-1s-15w | * | 1173 |

## Mississippi

**Attala County (Wildcat)—**

| | | |
|---|---|---|
| F. R. Jackson et al, Federal Land Bank 1, 29-16n-9e | * | 4516 |

**Holmes County (Wildcat)—**

| | | |
|---|---|---|
| A. H. Rowan, Smith 1, 7-14n-1w | * | 5825 |

**Humphreys County (Wildcat)—**

| | | |
|---|---|---|
| J. B. Moncrief, State 1, 9-15n-2w | * | 5522 |

**Yazoo County (Pickens)—**

| | | |
|---|---|---|
| Exchange Oil Co., Wilburn 1, 31-12n-3e | 1300 | 4873 |

**Yazoo County (Tinsley Dome)—**

| | | |
|---|---|---|
| Hassie Hunt, Lammons 1, 1-10n-3w | 500 | 5212 |
| Union Producing Co., Woodruff B-1, 18-10n-2w | * | 5939 |
| Twiner 2, 1-10n-3w | 480 | 4869 |

## Montana

**Glacier County (Cut Bank)—**

| | | |
|---|---|---|
| Helmac Trust Co., Government 3, nw se sw 32-33n-5w | 132 | 2837 |
| A. J. Kately, Agent, Kramer 1, cnl se ne 15-34n-6w | 8 | 2939 |
| Santa Rita O. & G. Co., Lander 5, se nw se 16-36n-4w | (¶2.75) 300 | 2848 |

**Toole County (Kevin-Sunburst)—**

| | | |
|---|---|---|
| A. E. Crumley & Son, Fryberger 18, cel se sw 24-35n-3w | 15 | 1577 |
| Frazier & Smith, Van Note 2, cnl sw nw 30-35n-2w | 15 | 1542 |

## New Mexico

**Eddy County—**

| | | |
|---|---|---|
| Green Bay Oil Co., Paton-Erwin 3-A, se ne sw 9-18s-31e | * | 3904 |
| Stout & Waddell, Iles 1, se ne sw 17-16s-29e | 20 | 1812 |

**Eddy County (Wildcat)—**

| | | |
|---|---|---|
| Sanders Bros., De Temple 1, c nw nw 27-19s-31e | † | 647 |

**Lea County (Eunice)—**

| | | |
|---|---|---|
| Cities Service, Closson 7-AA, c sw se 18-22s-36e | 828 | 3825 |

**Lea County (Lynn)—**

| | | |
|---|---|---|
| Continental et al, Lynn 4-A-28, c sw se 28-23s-36e | 576 | 3650 |

**Lea County (Maljamar)—**

| | | |
|---|---|---|
| B. Cockburn et al, Baish 8-B, c ne se 27-17s-32e | 524 | 4053 |
| R. W. Fair et al, Baish 5-B, c ne se 22-17s-32e | 700 | 4055 |

**Lea County (Penrose)—**

| | | |
|---|---|---|
| J. C. Clower et al, Christmas-Gulf 5-B, se sw sw 28-22s-37e | 60 | 3680 |

**Lea County (Vacuum)—**

| | | |
|---|---|---|
| Magnolia, State-Bridges 63, c ne sw 13-17s-34e | 131 | 4673 |

## New York

**ALLEGANY COUNTY**

| | | |
|---|---|---|
| Walter McEnroe, Hoover farm, Bolivar | 30 | 1465 |
| Ebenezer Oil Co., Emerson farm, Scio | 5 | 1045 |
| Cretekos & Vossler, Norton farm, Scio | 7 | 1032 |
| Bradley Prod. Corp., Monitor farm, Alma | 4 | 1236 |
| J. F. McBride, Garthwaite farm, Alma | 6 | 1280 |
| L. H. Thornton et al, Brown farm, Alma | 8 | 1382 |
| Charles Petra, W. R. Hill farm, Genesee | 5 | 1320 |
| Max Andrews, Burdick farm, Wirt | 6 | 1332 |
| **Water Intake Wells** | | |
| LeMont Oil Co., Pierce farm, Wirt | ... | 1335 |
| Messer Oil Corp., Miles farm, Bolivar | ... | 1426 |
| N. V. V. Franchot, Reddy farm, Alma | ... | 1440 |
| Bradley Prod. Corp., Monitor farm, Alma | ... | 1311 |
| L.&M. Oil Co., Bush farm, Scio | ... | 1346 |
| Stout & Stout Oil Co., Brandes farm, Wellsville | ... | 1420 |
| Leonard Runyen et al, LaFrone Clark farm, Independence | ... | 1043 |
| Sloan & Zook, McDivitt farm, Bolivar | ... | 1320 |
| Clair Oil Co., Clemons farm, Clarksville | ... | 1470 |
| L. H. Thornton et al, Brown farm, Alma | ... | 1274 |

## Ohio

**Ashland County—**

| | | |
|---|---|---|
| Ohio Fuel Gas Co., Hall 2 | ¶.25 | 2886 |

**Athens County—**

| | | |
|---|---|---|
| Carpenter & Glazier, Smith 24 | 5 | 350 |
| Ohio Fuel G. Co., Sunday Creek Coal Co. 179 | ¶.25 | 295 |

**Coshocton County—**

| | | |
|---|---|---|
| Pure, Meyers 1 | 112 | 3185 |
| Warsaw O. & G. Co., Laughlin 1 | * | 3410 |

**Cuyahoga County—**

| | | |
|---|---|---|
| Benedum & Trees, Goodman 1 | ¶.47 | 2834 |

**Fairfield County—**

| | | |
|---|---|---|
| Gas Prod. Co. of Ohio, Stanley 2 | 3 | 1993 |
| City Nat. G. Co., Stuckey 1 | ¶.07 | 2083 |
| Webb 1 | * | 2202 |

**Guernsey County—**

| | | |
|---|---|---|
| J. Bendas et al, Guernsey County Infirmary 2 | 15 | 438 |
| Ohio Fuel G. Co., Smith 2 | ¶.06 | 1613 |
| Dollison & Somers' Marshall 1 | * | 1236 |

**Holmes County—**

| | | |
|---|---|---|
| Ohio Fuel G. Co., Kaylor 1 | * | 3039 |

**Knox County—**

| | | |
|---|---|---|
| Ohio Fuel G. Co., Fields 1 | ¶.55 | 2484 |

**Lawrence County—**

| | | |
|---|---|---|
| Portage Producers, Cambria Clay Products Co. 9 | ¶1.10 | 3001 |
| Ohio Fuel G. Co., Gillett 1 | ¶.15 | 2848 |

**Licking County—**

| | | |
|---|---|---|
| Allen Willey et al, Spencer 1 | ¶2.00 | 2353 |
| C. O. Moore et al, Norman 1 | ¶.95 | 2576 |
| Ohio Fuel G. Co., Phillips 1 | ¶.50 | 2444 |
| National Dr. Co., Broadway Manor 1 | ¶.50 | 2321 |
| Wm. Stricker et al, Fisk 1 | ¶.07 | 584 |
| Davidson & Rubin, Fee 1 | * | 2350 |

**Medina County—**

| | | |
|---|---|---|
| Preston Oil Co., Packard 5 | 15 | 484 |
| Packard 6 | 15 | 484 |
| Vanderink 20 | 15 | 329 |
| Homan 15 | 25 | 324 |
| Homan 16 | 15 | 329 |
| Homan 19 | 30 | 324 |
| Homan 21 | * | 338 |
| Edson & Son, Brant 8 | 5 | 520 |
| Brant 9 | 10 | 494 |
| Brant 10 | 15 | 485 |
| Brant 11 | 5 | 492 |
| Brant 12 | 10 | 498 |
| Auble 4 | * | 349 |
| Auble 5 | * | 350 |
| Defusto & Sawinger, Alles 1 | 2 | 409 |
| A. H. Moore et al, Kulp 1 | * | 580 |

**Meigs County—**

| | | |
|---|---|---|
| Bengel Co., St. Clair 1 | ¶ | 1713 |

**Monroe County—**

| | | |
|---|---|---|
| H. B. Walker Co., Ayers 1 | 2 | 1020 |

**Muskingum County—**

| | | |
|---|---|---|
| Atha Co., Kraft 1 | ¶1.40 | 3459 |
| Sherman 2 | ¶.20 | 4138 |
| Gas Prod. Co., Weaver 1 | * | 3890 |

**Noble County—**

| | | |
|---|---|---|
| Lumbatis Co., Pepper 1 | 2 | 875 |
| Chaseville O. & G. Co., Craft 1 | ¶.10 | 1627 |
| Ohio Fuel G. Co., Shamhart 1 | * | 1575 |

**Perry County—**

| | | |
|---|---|---|
| Preston Oil Co., Pettit 2 | 23 | 3264 |
| Chartiers Oil Co., Hocking Valley Products Co. 218 | 15 | 3483 |

**Summit County—**

| | | |
|---|---|---|
| Dempsey Co., Mueller 1 | ¶.25 | 2990 |

**Tuscarawas County—**

| | | |
|---|---|---|
| Nat. G. Co. of W. Va., Hrometz 1 | * | 4713 |

**Washington County—**

| | | |
|---|---|---|
| Baker & Daley, Pryor 5 | 10 | 1385 |
| Best Run O. & G. Co., Martin 2 | ¶ | 1175 |

## Oklahoma

**Caddo County—**

| | | |
|---|---|---|
| Ohio et al, Yule 3, sw ne sw 1-5n-9w | * | 6015 |
| Pau-Kune 15, swc se 3-5n-9w | 1590 | 3503 |
| Wagner 7, nw se sw 12-5n-9w | 816 | 3400 |
| Johnson et al, Littlechief 1, nec 3-5n-9w | * | 4200 |

**Carter County—**

| | | |
|---|---|---|
| Tomlinson, Fee 1, ne ne nw se 16-4s-3w | 7 | 1110 |

**Cotton County—**

| | | |
|---|---|---|
| Selby, Abbott 1, swc nw 11-5s-12w | * | 3480 |

**Creek County—**

| | | |
|---|---|---|
| Chapman, Spteigledger 1, nec 2-14n-10e | * | 3125 |

**Hughes County—**

| | | |
|---|---|---|
| Davon, White 2, csw se 5-8n-10e (OTD 3096) | 40 | 3115 |

**Jackson County—**

| | | |
|---|---|---|
| Ray, Mathis 2, nw sw se 32-1n-19w | * | 2651 |
| Vaughn, Stokes 2, se sw sw 11-1n-20w (OTD 1391) | 40 | 1420 |
| Hanna et al, Hardcastle 1, nwc sw 15-1n-20w (OTD 1700) | * | 1580 |
| Henry et al, Miner 1, nwc 15-1n-20w (OTD 1519) | 360 | 1524 |
| Henry 2, ne nw nw 15-1n-20w | 4 | 1593 |

**Kiowa County—**

| | | |
|---|---|---|
| Spink et al, Spink 1, nec se 11-5n-17w | * | 335 |
| Gled, McCurdy 1, ne nec 18-6n-17w | * | 891 |

**Logan County—**

| | | |
|---|---|---|
| Carter, Walker 1, cne ne 33-17n-4w (OTD 6245) | 5 | 6136 |
| Sinclair Prairie, Knecht 1, swc ne 28-18n-4w (OTD 4060) | ¶15.8 | 3287 |

**Noble County—**

| | | |
|---|---|---|
| Aladdin, Wentz 1, cw½ ne sw 11-22n-2e | * | 4486 |

**Okmulgee County—**

| | | |
|---|---|---|
| Berry Bros., Jobe 1, ne sw ne 5-13n-12e | * | 3002 |

**Osage County—**

| | | |
|---|---|---|
| Powers et al, 4, cn½ nw ne 35-24n-8e (OTD 2185) | 750 | 2441 |
| Tide Water, 8, ne sw ne 20-24n-9e | 50 | 2291 |
| Millard et al, 2, se sec nw 3-28n-11e | 10 | 962 |

**Pontotoc County—**

| | | |
|---|---|---|
| L. & L. Oil Co., McCoole 1, se sw ne 6-4n-7e | 6 | 1564 |
| Senora, Summers 1, ne sw sw 25-5n-4e | 35 | 2647 |
| Pine, Jeeter 1, sec sw 26-5n-4e | 220 | 2622 |
| Huddleston et al, Gilmore 1-A, sw nwc 15-5n-8e | 15 | 794 |

**Pottawatomie County—**

| | | |
|---|---|---|
| Simpson-Roodhouse, Neal 1, nw ne se 33-6n-3e | * | 4012 |
| Denver P. & R., Richards 3, se ne ne 2-6n-4e | * | 3382 |
| Sinclair Prairie, Deatheridge 1, nwc 28-7n-4e (OTD 4375) | 60 | 3978 |
| Alma et al, Rhodd 1, se ne nw 32-7n-5e | 3 | 2850 |
| Dunnett, Euton 1, nec 1-10n-3e | * | 5380 |
| Berkey et al, Wilson 1, nwc 4-11n-6e | 130 | 3382 |

**Seminole County—**

| | | |
|---|---|---|
| McMahon, Burgess 2, nec 29-6n-6e | ¶27.8 | 3608 |
| Thompson, Harriman "D" 1, ne se se 33-7n-6e | 70 | 2866 |
| Harriman "D" 2, nw se se 33-7n-6e | 130 | 2844 |
| Key, Carter 1, sw se sw 22-8n-7e | 25 | 3226 |
| McIntyre, Johnson 7, ne nw sw ne 10-10n-8e | 30 | 1651 |
| Droppleman, Gahagan 1, nec 3-11n-8e | 800 | 4157 |

**Tulsa County—**

| | | |
|---|---|---|
| Trowbridge et al, Fee 1-A, se ne nw 7-18n-14e | ¶0.5 | 1220 |

## Pennsylvania

**BRADFORD DISTRICT**

| | | |
|---|---|---|
| Penn Valley Crude Oil Corp., fee | 5 | ... |
| Duffytown Oil Co., fee | 1 | ... |
| N. V. V. Franchot, Mgr., Trustee, Brandel | 15 | ... |
| C. W. Foster et al, Warters | 6 | ... |
| Forest Oil Corp. | 1 | ... |
| Forest Pet. Corp., 2 wells | 2 | ... |
| Niagara Oil Corp., 3 wells | 3 | ... |
| Bradford Transit Co., 31 wells | 31 | ... |
| Lane No. 1 et al, Bing 371 | 2 | ... |
| Daly & Healy, Bing 500 | 1 | ... |
| Melvin Towne Oil Co., fee | 1 | ... |
| **Water Intake Wells** | | |
| Forest Oil Corp., 2 wells | ... | ... |
| Forest Pet. Corp. | ... | ... |
| Niagara Oil Corp., 6 wells | ... | ... |
| Andrus & MacDowell, Bing 326 | ... | ... |
| Pine Run Oil Co., Bing 130-1-2-3-4-6, 2 wells | ... | ... |

**MIDDLE DISTRICT**

| | | |
|---|---|---|
| I. Dana Kahle, J. M. Nickel | ¼ | ... |
| **Water Intake Well** | | |
| Cities Service, Hamilton | ... | ... |

**BUTLER-ARMSTRONG DISTRICT**

| | | |
|---|---|---|
| Dow Smith et al, Denny | ¶ | ... |

**SOUTHWEST PENNSYLVANIA**

**Armstrong County—**

| | | |
|---|---|---|
| Equitable Gas Co., Prugh 1 | ¶.07 | 3620 |
| Peoples Nat. G. Co., Smith 1 | * | 3592 |

**Fayette County—**

| | | |
|---|---|---|
| Greensboro Gas Co., Kopsey 1 | ¶.17 | 2553 |

**Greene County—**

| | | |
|---|---|---|
| Judson Bell et al, Black 1 | ¶5.00 | 3000 |

**Indiana County—**

| | | |
|---|---|---|
| J. Cloid Rinn, Perdons Hrs. 1 | ¶.14 | 1596 |

**Westmoreland County—**

| | | |
|---|---|---|
| Appollo Gas Co., Jones Hrs. 1 | ¶.18 | 3612 |
| Peoples Nat. G. Co., Townsend 1 | ¶.01 | 3090 |

## North Texas

**Archer County (Hull-Silk)—**

| | | |
|---|---|---|
| Chapman & McFarlin, Wilson 6-E | 906 | 4400 |
| Continental, Wilson-McCrory 14 | 744 | 4373 |
| Ed. Cox & Hamon, Little-Big 3 | ... | ... |
| Helmerich & Payne, Shephard 6 | 252 | 4317 |
| Bert Ligon-Deep Oil Dev. Co., Wilson 5 | 893 | 3780 |
| Moran Bros. Inc., Carson 2 | 1272 | 4348 |
| W. H. Peckham et al, Krebs 1 | 612 | 4398 |
| Ed. Peterson & McCarty, Wilson 35-B | 1176 | 4380 |
| Pet. Prod. Co., Wilson-McCrory 5 | 991 | 4377 |

**Archer County—**

| | | |
|---|---|---|
| Cochran & Cain, Little 3-B | 149 | 1308 |
| Panhandle Ref. Co., Green 18-C | 67 | 1138 |

**Baylor County (Wildcat)—**

| | | |
|---|---|---|
| P. B. Scott et al, Farr 1 | * | 3144 |

**Baylor County (Rendham)—**

| | | |
|---|---|---|
| British-American O. P. Co., Green 2-L | * | 3081 |

**Clay County—**

| | | |
|---|---|---|
| Sussex Oil Corp., Glasgow 3 | 3 | 184 |

**Cooke County (Walnut Bend)—**

| | | |
|---|---|---|
| Ed. Cox & Hamon, Neu-Texaco 10-A | 544 | 5003 |
| Neu-Texaco 10-B | 756 | 4934 |
| Sinclair Prairie, McGeorge 12 | 468 | 4939 |

# United States Well Completions—*Continued*

| Company, Well and Location | Init. Prod. Bbls. | Depth |
|---|---|---|
| **Cooke County—** | | |
| Humble, W. Helman 1 | 16 | 1862 |
| Trumter Pet. Corp, Andress 18 | * | 1457 |
| **Cooke County (Wildcat)—** | | |
| B. E. Cranfill-S. S. Staley, Peery 1 | * | 2505 |
| **Grayson County (Collinsville)—** | | |
| Jim Anderson et al, Hulme 1 | * | 4220 |
| **Jack County—** | | |
| Target Dr. Co., Kuykendall 5 | 680 | 3242 |
| Three-B Inv. Corp., Matlock 3-B | 35 | 3204 |
| **Montague County (Bowers)—** | | |
| W. H. Gant et al, Robinson 1 | * | 4300 |
| **Montague County (Nocona)—** | | |
| Anderson-Prichard et al, Reed 1 | 1720 | 4352 |
| **Montague County (Wildcats)—** | | |
| Lesh & McCall, Holt 1 | * | 1858 |
| Seitz-Comegys & Seitz, King 1 | * | 4066 |
| **Wichita County (K-M-A)—** | | |
| Blanco Oil Co.-Al. Buchanan, Thom 2 | 1440 | 3838 |
| E. C. Oil Co., Burnside 8 | 9 | 4069 |
| Falls Ref. Co., Tidwell 1 | 95 | 3860 |
| Hanlon & Buchanan, Inc. Fassett-Tuttle 10-E (pb to 4089 ft) | 314 | 5096 |
| Fassett-Tuttle 17-G | 410 | 4080 |
| A. L. Lowe et al, Anderson 1 | 47 | 3882 |
| Southport Pet. Co., Wichita River 11-A | † | 3925 |
| Tide Water et al, Mangold 10 | 1200 | 3745 |
| Ven-Mex Oil Co., Wichita River 11-A | 1120 | 3816 |
| **Wichita County—** | | |
| Deaton & Boardman, George 1 | † | 1466 |
| King Oil Co., Burnett 14 | * | 1954 |
| Wolfe & Hull, Daume 2 | 41 | 698 |
| **Wichita County (Wildcat)—** | | |
| H. H. Fraser et al, Long 1 | * | 1614 |
| **Wilbarger County—** | | |
| Phillips, Waggoner Est. 3-KKK | * | 2675 |
| Pois & Schultz, Barnes 2 | * | 1800 |
| Texas Co., Waggoner Est. 27-E | 17 | 2438 |
| **Wilbarger County (Consolidated)—** | | |
| Pois & Schultz, Barnes 1 | 25 | 4065 |
| **Young County—** | | |
| E. W. Robitaille et al, Vaughn 5-A | 2184 | 4002 |

## Texas Panhandle

| | | |
|---|---|---|
| **Carson County—** | | |
| Ryan Consol'd Pet. Corp., Block 14 | 86 | 3135 |
| Block 15 | 77 | 3157 |
| Block 16 | 65 | 3144 |
| Texas Co., Boney-Magnolia 25 | 354 | 3125 |
| **Gray County—** | | |
| Moran Bros. Dr. Co., Skidmore 3 | 270 | 3305 |
| **Hutchinson County—** | | |
| McIlroy Oil Co., Haile 13 | 602 | 3010 |
| C. L. McKinney et al, Pitcher 7 | 287 | 3168 |
| Skelly, Watkins 9-A | 343 | 2900 |
| **Wheeler County—** | | |
| Smith Bros. Ref. Co., Harlan 13 | 139 | 2520 |

## Texas Gulf Coast

| | | |
|---|---|---|
| **Anahuac—** | | |
| Humble, Johnson 33 | 670 | 7232 |
| **Angleton—** | | |
| McCarthy, Galatznik 1 | 194 | 10,492 |
| **Bay City—** | | |
| Hamman, Slone 4 (wo) | 300 | 9185 |
| **Boling—** | | |
| Mackhank, Farmer C-4 (wo) | 347 | 4394 |
| **Clear Lake—** | | |
| Humble, West Fee C-41 | 265 | 5910 |
| **Eureka—** | | |
| Tide Water, Lackner B-2 (wo) | 86 | 7984 |
| **Fairbanks—** | | |
| Amerada, Foley 1 | 148 | 6836 |
| Foley 22 | 133 | 6842 |
| Margay, White 5 | 70 | 6828 |
| **Friendswood—** | | |
| Humble, Beamer 36 | 172 | 10,042 |
| **Goose Creek—** | | |
| Grace, Wright 2 | 204 | 1729 |
| **Hankamer—** | | |
| Gulf, Boyt 7 | 136 | 4120 |
| **Hull—** | | |
| Texas, Hannah 6 (wo) | 216 | 4055 |
| **Humble—** | | |
| Texas, Koehler 39 (wo) | 116 | 3128 |
| **Orange—** | | |
| Wallace, Norwood 1 | 136 | 5904 |
| **Old Ocean—** | | |
| Stanolind, Hughes 1 | 380 | 11,014 |
| **Pickett Ridge—** | | |
| Texas, Pierce A-37 | 7 | 4702 |
| **Pierce Junction—** | | |
| Rio Bravo, Settegast A-5 (wo) | 102 | 4042 |
| **North Thompson—** | | |
| H. M. Naylor, Hampil 1 | 1109 | 7975 |
| **Sour Lake—** | | |
| United O. & F., Moore 2 (wo) | 7 | 2889 |
| **South Houston—** | | |
| T. A. Carlton, Williams 2 | 91 | 3865 |
| **Spindletop—** | | |
| Abbott, Sun Oil Co. 3 | 89 | 836 |
| Stanolind, Gladys City 51 (wo) | 147 | 2790 |
| **Tomball—** | | |
| Humble, Holderreith 4-A | * | 5571 |
| **Withers—** | | |
| Texas, Broussard 23 | 375 | 5541 |
| Pierce 51 | 120 | 5340 |
| Pierce 71-C | 101 | 5392 |
| **West Columbia—** | | |
| Texas, Phillips 14 | 279 | 5733 |

## South Texas

### CORPUS CHRISTI DISTRICT

| | | |
|---|---|---|
| **Aransas County—** | | |
| F. A. Gillespie & Sons Co., Grief 1 (McCampbell) | 400 | 7343 |
| **Brooks County—** | | |
| Humble, McGill Bros. 55 (Kelsey) | 450 | 4729 |
| **Calhoun County—** | | |
| Humble, Welder B-24 (Heyser) | 600 | 5486 |
| **Hidalgo County—** | | |
| Royal O. & G. Co., Chapa 2-A (Samfordyce) | 350 | 4119 |
| **Jackson County—** | | |
| American Liberty Oil Co., L. Ranch Co. 7 (West Ranch) | 750 | 5783 |
| British American Oil Co., Community-Broughton 1 (Francitas) | 600 | 7959 |
| Magnolia, Texas 1 (West Ranch) | 1200 | 5107 |
| West 54-A (West Ranch) | 1000 | 5535 |
| W. R. R. Oil Co., Texas 3 (West Ranch) | 1250 | 5605 |
| **Jim Wells County—** | | |
| Rodney Delange, McNeil 8 (Wade City) | 750 | 4947 |
| Gilcrease Oil Co., Adams A-1 (Alfred) | 350 | 4863 |
| Heyser & Heard, Romana V. de Garcia 5 (Ben Bolt) | 750 | 5305 |
| Rowan & Hope, Inc., Robert Adams 7 (Alfred) | 350 | 4696 |
| M. Stover, Lozano B-1 (Premont) | 40 | 2363 |
| **Live Oak County—** | | |
| Smith & Storey, Inc., Lyne 2 (WC), sur 163 | * | 3352 |
| **Nueces County—** | | |
| Sinclair Prairie, Texas 1 (997) (E. White Point) | 500 | 5635 |
| Texas 2-A (E. White Point) | 500 | 5630 |
| **Refugio County—** | | |
| Coronado Corp., Rooke 3 (GI) (La Rosa) | ¶20 | 5850 |
| **San Patricio County—** | | |
| Bay-Tex Oil Co., Davenport & Wilson 1 (McCampbell) | 300 | 7225 |
| Midway Victory Oil Co., Floerke 1 (Midway) | 175 | 5341 |
| **Victoria County—** | | |
| W. V. Hardin, Bass 2 (Victoria) | 1000 | 3041 |
| Stanolind, Vandenberg & Hill 10 (E. Placedo) | 350 | 6500 |
| **Duval County—** | | |
| Cox & Hamon & Gorman-Yoakam, Sophie Hoffman 8 (109) (Tarancahaus) | 133 | 2071 |
| Cuellar Bros. Oil Co., Cuellar 1-B (Hoffman) | 15 | 2852 |
| Humble, D.C.R.C. 16-F (Cedro Hill) | 21½ | 1438 |
| Magnolia, D.C.R.C. 3 (190) (Cedro Hill) | 5½ | 1435 |
| Weil 11 (495) (Hoffman) | * | 2805 |
| Weil 12 (495) (Hoffman) | * | 2813 |
| Weil 26 (496) (Hoffman) | 38 | 2679 |
| **Jim Hogg County—** | | |
| Humble, King Ranch-Colorado 11 (Colorado) | 350 | 3061 |
| **McMullen County—** | | |
| Rhea Nixon et al, Horton 1 (WC), sur 29 | * | 666½ |
| **Starr County—** | | |
| W. R. Davis & Co., Davenport A-1 (Rincon) | 400 | 4383 |
| Slick Est. A-4 (Rincon) | 350 | 4333 |
| Slick Est. 5-A (Rincon) | 500 | 4248 |
| Slick Est. 23-B (Rincon) | 50 | 4347 |
| Slick Est. 26-B (Rincon) | 125 | 4311 |
| Interstate Minerals, Green & Manning 1 (WC) Por. 81 | ¶50 | 2644 |
| Sun, Olivarez 8-A (Sun) | 500 | 4950 |
| Rodriguez 1 (WC) Santa Teresa Gr. | ¶1 & 50 | 7507 |
| Speer 7 (Sun) | 400 | 5004 |
| **Webb County—** | | |
| Cash & Reynolds, DeSpain 1 (WC), Sur. 17 | * | 2263 |
| Magnolia, Volpe-Benavides 28-A (Volpe) | 250 | 2459 |
| Red Bank Oil Co., Adami 4 (Adami) | 38½ | 962 |
| Sinclair Prairie, Callaghan Land & Pastoral Co. 1 (WC), sec 585 | * | 9501 |
| **Zapata County—** | | |
| Dulup Oil Co., Trevino 18-A (Escobas) | 27 | 1387 |
| O. W. Killam, Hinnant 4 (WC), sur 182 | * | 1697 |
| **Caldwell County—** | | |
| J. E. Dickerson, Connely 1 (Salt Flats) | * | 2860 |
| Ralph R. Ogden, Talley 8 (Dale) | 145 | 2305 |

## West Central Texas

| | | |
|---|---|---|
| **Callahan County—** | | |
| Heist et al, Isenhower 1 | * | 275 |
| Jackson et al, Williams 1 | * | 592 |
| Stutenroth et al, Norton 1 | * | 660 |
| **Callahan County (Wildcat)—** | | |
| Ungren-Frazier-Beams Dr. Co., Jackson 1 | 154 | 928 |
| **Jones County—** | | |
| Butler-Horne Dr. Co., Thompson 2 | 150 | 2382 |
| **Shackelford County—** | | |
| Georgian Oil Corp., Blach 17 | 5 | 615 |
| Hart et al, Sanders 6 | * | 640 |
| Roark & Hooker, Hatcher 1 | * | 717 |

## East Texas

| | | |
|---|---|---|
| **Joiner Area—** | | |
| Alex McCutchin et al, fee 3 (7.38-ac) | 75 | 3613 |
| M. H. McMurrey et al, Turner 20 (199-ac) | 1500 | 3803 |
| **Kilgore Area—** | | |
| American Liberty Oil Co., Sabine River 34, Tr 5 (167.4-ac) | 3600 | 3531 |
| Gross & Shulman, Walker-Sun 1 (40-ac) | 240 | 3720 |
| **Longview Area—** | | |
| Humble, Hughes 51 (245.6-ac) | 3000 | 3644 |
| Hughes 52 (245.6-ac) | 2500 | 3683 |
| T. W. Lee et al, Harper 1 | 1200 | 3632 |
| B. F. Phillips Pet. Co., Everett 3, blk 15 | 1500 | 3678 |
| **Falls County (Wildcat)—** | | |
| Mack Hayes et al, Taylor 1 | * | 1204 |
| **Houston County (Grapeland)—** | | |
| Lone Star Gaso. Corp.-Trinity Gas Corp., Dailey 1 | ¶75.00 | 5952 |
| Dorsey 1 | ¶75.00 | 6004 |
| Hughes 1 | ¶75.00 | 6013 |
| **Titus County (Talco)—** | | |
| Magnolia, Duke 3 | 302 | 4300 |

## West Texas

| | | |
|---|---|---|
| **Crane County (Gulf-Waddell)—** | | |
| Gulf, W. N. Waddell 30 | 3592 | 3493 |
| **Crane County (Jordan)—** | | |
| Atlantic Ref. Co., University 6-A | 1288 | 3559 |
| Kewanee Oil Co., University 6-B | 1439 | 3575 |
| Sinclair Prairie, University 6-24 | 472 | 3595 |
| **Crane County (McCamey)—** | | |
| Texas Consolidated Oil, Hughes-Texaco 10 | 119 | 2110 |
| **Ector County (Foster)—** | | |
| Atlantic Ref. Co., Henderson 10 | 1027 | 4230 |
| J. D. Bodkins et al, Johnson-Texaco 2-J | 537 | 4160 |
| Great Western Prod., Johnson 1 | 778 | 4105 |
| I. T. I. O. Co., Johnson 1-E | 175 | 4202 |
| Stanolind, Cowden 39-A | 453 | 4140 |
| Cowden 47-A | 271 | 4156 |
| Sunray Oil Co., Johnson 2-D | 658 | 4150 |
| **Ector County (Goldsmith)—** | | |
| Gulf, Goldsmith 278 | 165 | 4216 |
| Goldsmith 282 | 1034 | 4231 |
| **Ector County (Jordan)—** | | |
| Snowden & McSweeney Co., University 3, lse 2 | 397 | 3625 |
| Texas Co., Connell 25 | 1688 | 3660 |
| **Ector County (North Cowden)—** | | |
| Llano Oil Co., Holt 3-B | 1158 | 4190 |
| Sun, Holt 4-D | 400 | 4533 |
| **Ector County (North Cowden-Holt)—** | | |
| Llano Oil Co., Holt 2-B | 487 | 5150 |
| **Gaines County (Seminole)—** | | |
| Atlantic Ref. Co., Riley 6-B | 1005 | 5261 |
| Ohio Oil, Averitt 3 | 508 | 5260 |
| Osage Dr. Co., Tippett-Ohio 9-A | 795 | 5349 |
| **Pecos County (Tobarg)** | | |
| Cardinal Oil Co., Tippett-Kirby 57-E | 26 | 479 |
| A. J. Rife et al, Tippett-Conoco 14 | 33 | 475 |
| **Pecos County (Yates)—** | | |
| Ohio Oil, Smith 14 | 4500 | 1842 |
| **Scurry County (Sharon)—** | | |
| Coffield & Guthrie, Snyder Bank 3, lse 3 | 108 | 2435 |
| **Terrell County (Wildcat)—** | | |
| E. M. Thomasson Prod. Co., Bates-Graham 2 | * | 1531 |
| **Upton County (McCamey)—** | | |
| T. P. Coal & Oil Co., Shirk 1-C | 153 | 2731 |
| **Ward County—** | | |
| Acme O. & Roy. Co., Sloan-Shell 1 | 220 | 3037 |
| Gulf Oil Corp., Estes 133 | 2984 | 2692 |
| A. E. Lynch et al, Miller-Reynolds 2 | 188 | 1971 |
| **Yoakum County (Wasson)—** | | |
| Aloco Oil Co., Smart-Texaco 7 | 684 | 5146 |
| White-Texaco 4 | 616 | 5245 |
| Willard-Texaco 5-C | 1746 | 5175 |
| Honolulu Oil Corp., Kendrick 5-825 | 1451 | 5145 |
| Carl B. King Dr. Co., Brand 1 | 657 | 5048 |
| Mabee O. & G. Co., Willard 2-B | 683 | 5175 |
| Shell, Baumgart 10-D | 1133 | 5176 |

## West Virginia

| | | |
|---|---|---|
| **Boone County—** | | |
| Owens-Libby-Owens, Bull Creek Coal & Land Co. 14 | ¶.50 | 4653 |
| **Gilmer County—** | | |
| McCall Dr. Co., Fling 2 | ¶.30 | 1694 |
| Pitts. & W. Va. G. Co., Rinehart 7767 | ¶.10 | 1760 |
| **Kanawha County—** | | |
| South Penn Nat. G. Co., Wheatcraft 1 | ¶4.58 | 5146 |
| W. Va. Gas Corp., Jones 039 | ¶1.65 | 4951 |
| Godfrey L. Cabot, Bohnham 2 | ¶.96 | 1630 |
| **Lincoln County—** | | |
| Brooks Gas Co., Cummings 1 | ¶.03 | 3530 |
| **Ritchie County—** | | |
| Hope Nat. G. Co., Cokeley Hrs. 1 | 5 | 1565 |
| **Wayne County—** | | |
| Hale, Lowe & Francis, Luster 1 | ¶.18 | 3151 |
| Southern W. Va. Gas Corp., Pritchard 7 | ¶.07 | 3083 |
| Ky.-W. Va. Gas Co., Burgess 1 | ¶.07 | 3143 |

# WILDCAT REPORT
## New Starts and Completions

### ALABAMA

#### FIRST REPORT

**Mobile County**—Plains Producing Co., Tom Daly et al 1, nwc se se 2-6s-4w, dk (6500-ft test).

### ARKANSAS

#### COMPLETIONS

**Miller County**—K. E. Jennings and J. & J. Oil Co.'s H. T. Wood 1, ne sw ne 33-18-28 (7 mi nw of Doddridge), elev 323 ft, top first Nacatoch 1908 ft, top Nacatoch 1952 ft, top Midway 1125 ft, base Annona chalk 2732 ft, top Blossom 3165 ft, top Tokio 3325 ft, top Georgetown 3891 ft, abnd 4562 ft, Red Iron Dr. Co.'s Philyaw 1, nwc ne se 7-17-26 (4 mi ne of Fouke), elev 307 ft, top Wilcox 276 ft, top Midway 1125 ft, top Arkadelphia, 1678 ft, top Nacatoch 1712 ft, top Nactoch sand 1752 ft, top Annona chalk, 2469 ft, abnd 4302 ft.

### CALIFORNIA

#### FIRST REPORTS

**Kern County**—Hall-Baker Co.'s No. 1, sec 18-26-28, sp, Mt. Poso area.

**Orange County**—Security Land & Water Co.'s Severs 1, sec 9-3-10, lcn, La Habra area.

**Ventura County**—Charles F. Gerard's Berson 1, sec 18-4-19, lcn, Sespe area.

#### COMPLETIONS

**Fresno County**—Shell's No. 45-2, sec 2-20-15, bottomed 3745 ft, pumping 19 bbls hour gross, cut varied 3.8 to 91 percent, Coalinga shallow area.

**Kern County**—Lindley C. Morton's Jewett 1, sec 23-31-29; basement 6695 ft, plugged 6680 ft, flowed salt water, abnd, Arvin area, Union Oil Co.'s Fitzgerald-Weston 1, sec 13-29-21, bottomed 7493 ft, brown shale, abnd, South Belridge area. Shell's BVA 45-9, sec 9-32-25, bottomed 12,027 ft, hard sand, streaks shale, abnd, Buena Vista area. Oil Scout, Inc.'s Tejon Minerals 1, sec 27-32-29, bottomed 7008 ft in gray sand, abnd, Comanche Point area. Franco-Western Oil Co.'s No. 19; sec 8-30-22, bottomed 981, pumping 57 bbls daily, 16.5 gravity, cut 5 percent, McKittrick area.

### IOWA

#### FIRST REPORT

**Page County**—Smythe, McLaughlin & Comfort's Hook 1, c ne nw 18-69n-35w, sp and sd.

### SOUTH LOUISIANA

#### FIRST REPORTS

**Beauregard Parish**—Danciger's Le Ray 1, 1½ mi sw De Ridder, sec 2-3s-9w, lcn.

**Calcasieu Parish**—W. T. Burton's Mayo Realty Co. 1, South Lake Charles prospect, sec 11-8s-11w, lcn.

**Cameron Parish**—Superior's State 3, Calcasieu Lake area, sec 1-14s-9w, lcn.

**Vermilion Parish**—I. Delcambre's Reynaud 1, Delcambre area, sec 17-13s-5e, lcn.

#### COMPLETIONS

**Iberville Parish**—Shell's Southwood Plantation 1, San Gabriel area, abnd 7308 ft.

### NORTH LOUISIANA

#### FIRST REPORTS

**Claiborne Parish**—W. A. Hardin's Shreveport) Valentine 1, nw 31-20n-6w, mat.

**Madison Parish**—H. L. Hunt's Ayers 1, c nw sw 18-15n-10e, mat.

### KANSAS

#### FIRST REPORTS

**Barton County**—Bartlett et al's Hulme 1, ce½ se sw 9-20-12w, dr.

**Ellsworth County**—Billings' Vanek 1, swc se 25-14-10w, lcn. Cities Service Kanak 1, swc 12-16-8w, lcn. Emerich et al's Hogy 1, cw½ sw ne 20-16-10w, rig. Palmer Oil Corp.'s Stratman 1, cs½ se nw 15-17-10w, rig.

**Pawnee County**—Magnolia Pet. Co.'s Smith 1, cel ne ne 12-21-15w, dr.

**Russell County**—Jones Bros.' Mahoney 1, csl sw sw 8-14-12w, mach.

#### COMPLETIONS

**Ellsworth County**—Pryor et al's Stratman 1, cw½ nw nw 1-17-10w, n Stratman pool, Arbuckle 3278 ft, so 3280-83 ft, td 3297 ft, 1000 gals acid, 3000 bbls.

**Pawnee County**—Lauck et al's Gilkison 1, ce½ ne sw 21-22-16w, 3 mi s Larned, Lansing 3641 ft, base Kansas City 3947 ft, Sooy 4024 ft, Simpson 4083 ft, Arbuckle 4105-25 ft, abnd 4125 ft.

**Russell County**—Simpson Oil Co. et al's Rush 1, cw½ nw sw 33-14-14w, sw Gurney pool, Lansing 2939 ft, Sooy 3186 ft, Arbuckle 3194 ft, Granite Wash 3201 ft, abnd 3230 ft.

### MICHIGAN

#### FIRST REPORTS

**Allegan County**—Seaboard Oil Co.,'s Gietzen 1, ne-se-sw 12-4n-12w, dr.

**Manistee County**—Collins & Shoemakers' Schimke 1, nw sw nw 31-23n-15w, lcn.

**Ottawa County**—Daily Crude Oil Co.'s Allen 1, nw nw ne 31-8n-13w, dr.

**Van Buren County**—Clapsaddle & Harris' Kopterski 1, sw sw sw 20-1s-14w, dr.

#### COMPLETIONS

**Calhoun County**—Alfred Morency's Platz 1, ne nw ne 3-4s-7w, Traverse 1405 ft, abnd 1410 ft.

**Clare County**—Sun's State A1, c s½ sw sw 4-20n-3w, Dundee 4008 ft, abnd 4298 ft.

**Isabella County**—Chapman Oil Co.'s Drier 1, 21-13n-5w, Dundee 3537 ft, so 3555 ft, abnd 3568 ft.

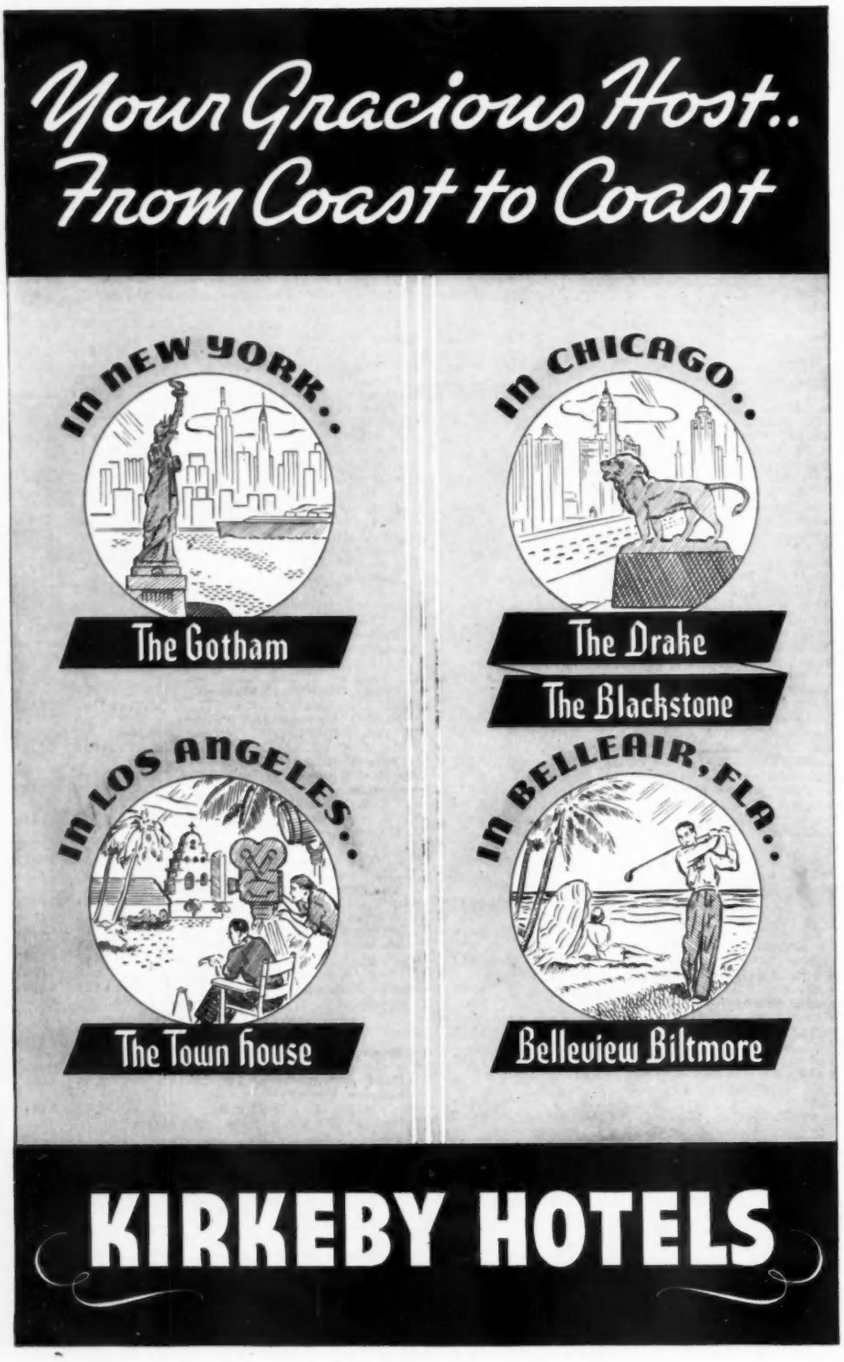
**Midland County**—C. M. Carrouther's Kleinhans 1, sw sw ne 2-13n-1w, Dundee 3475 ft, abnd 3545 ft.

**Muskegon County**—S. J. Higelmire's Haney 1, nw sw se 33-9n-16w, abnd 2250 ft.

**Ogemaw County**—Weber Oil Co.'s State 1, c w ne ne 25-24n-1e, Dundee 2786 ft, abnd 2990 ft.

**Ottawa County**—Freeman Oil Co.'s Kleis 1, nw nw nw 26-5n-15w, abnd 1615 ft.

**Van Buren County**—Westbrook Drilling Co.'s Mulhall 1, sw se sw 4-1s-15w, Traverse 1181 ft, abnd 1185 ft. Godfrey & Hosiers' Robbins 1, sw se nw 19-1s-15w, Traverse 1158 ft, abnd 1173 ft.

## MISSISSIPPI

### COMPLETIONS

**Attala County**—F. R. Jackson et al's Federal Land Bank 1, nw se 29-16n-9e, top chalk 1582 ft, base chalk 2200 ft, top Eutaw 2335 ft, abnd 4516 ft, shale.

**Holmes County**—A. H. Rowan's Smith 1, ne 7-14n-1w, abnd 5825 ft, shale.

**Humphreys County**—J. B. Moncrief's State 1, 9-15n-2w, elev 115 ft, top Wilcox 1314 ft, top Midway 3144 ft, top chalk 3991 ft, top Eutaw 4412 ft, abnd 5522 ft.

## OKLAHOMA

### FIRST REPORTS

**Atoka County**—Scrivner's Plettner 1, nwc ne 36-3s-13e, dr 1100 ft.

**Cotton County**—Scott's Masonic Home 1, nwc sw 13-4s-13w, dr 750 ft.

**Kiowa County**—Hurst et al's Groth 1, swc 3-4n-16w, sd 125 ft.

**Pontotoc County**—Sandback et al's Stotler 1, nec 26-5n-6e, rig.

**Seminole County**—Droppleman et al's Keyes 1, nec se 4-11n-8e, rig.

**Tillman County**—Kirksey et al's Gardner 1, ne sw se 24-1n-17w, sd 622 ft.

### COMPLETIONS

**Choctaw County**—Ross et al's Hardy 1, sec nw 21-7s-15e, 10 mi se Boswell, sand 1785 ft, abnd 1950 ft.

**Cotton County**—Selby O. & G. Co.'s Abbott 1, swc nw 11-5s-12w, se Randlett, Canyon lime 2380 ft, Arbuckle 3250 ft, abnd 3480 ft.

**Payne County**—Cities Service et al's State 1, se ne se 33-20n-4e, n Ingalls pool, Wilcox 4112 ft, abnd 4130 ft.

**Pontotoc County**—Patterson et al's Isaac 1, sw nw ne 3-4n-4e, 2 mi w Bebee pool, Sylvan 2560 ft, no Hunton, Viola 2690 ft, Trenton 2760 ft, first Wilcox 3115-28 ft, second Wilcox 3145 ft, abnd 3230 ft.

**Pottawatomie County**—Elm Oil Co. et al's Evans 1, sec ne 17-10n-5e, 3 mi n King pool, Mayes 4350 ft, Woodford 4490 ft, Misener 4584 ft, Hunton 4585 ft, Sylvan 4615 ft, Viola 4701 ft, Dense 4736 ft, Dolomite 4750 ft, first Wilcox 4783 ft, abnd 4792 ft.

**Seminole County**—P. J. McIntyre's Richardson 1, ne sw nw 19-10n-8e, 2 mi n N. Bethel pool, Calvin 2020-40 ft, Gilcrease 3340 ft, Wapanucka 3505 ft, abnd 3958 ft.

## NORTH TEXAS

### COMPLETIONS

**Baylor County**—Paul B. Scott et al's C. H. Farr 1, c ne ne T&NO sec 228, A-877, abnd 3144 ft.

**Clay County**—Staley Oil Co.-W. B. Omohundro's Percifield 1, SEc lot 37, J. T. Belcher sur, top Canyon 1770 ft, KMA lime 3610 ft, Bend 5667 ft, Ellenburger 6185 ft, abnd 6280 ft.

**Cooke County**—Britt Cranfill & S. S. Staley's S. H. Peery 1, 2025 ft from s 1935 ft from e of BBB&C sur A-145, abnd 2505 ft.

**Montague County**—Lesh & McCall's Holt 1, 1000 ft from n 1030 ft from w sec 26, Kaufman CSL sur, abnd 1858 ft. Seitz-Comegys & Seitz, Inc.'s King 1, 1093 ft from w 330 ft from n se¼ sec 8, E. B. Wooten sur, A-840 ft, abnd in granite 4064-66 ft.

**Throckmorton County**—Neustadt et al's Brown 3, TE&L sec 1608, abnd 702 ft.

**Wichita County (Wildcat)**—H. H. Fraser et al's Long 1, ne part Ed. Morrison sur, A-186, abnd 1614 ft.

### FIRST REPORTS

**Archer County**—L. T. Burns et al's Olney 1st Nat'l Bank-Shell 1, 450 ft out of NEc S. P. sec 25, A-1253, dr 715 ft.

**Clay County**—E. C. Norwood et al's K. N. Hapgood 1, 660 ft from s 330 ft from w blk 61, Marion CSL sur, A-308, dk for 6000-ft test.

**Wichita County**—Geo. W. Cooper et al's Waggoner Est. 33-C, 325 ft from s 5150 ft from w lines A. Gibson sur A-455, sp 4000-ft test. Mason & Edwards' W. B. Minnick 1, 150 ft out of nec sw H&GN sec 35, A-163, lcn.

## EAST TEXAS

### FIRST REPORT

**Rusk County**—J. Z. Werby et al's L. B. McMillan-Humble 1, 466 ft from sw 460 ft from se of 98-ac tr, W. F. Allison sur, 6 mi se New Salem, rig.

### COMPLETION

**Falls County**—Mack Hayes et al's Taylor 1, F. Mahon sur, 1 mi ne Lott, top Buda lime 1175 ft, abnd 1204 ft.

## WEST TEXAS

### FIRST REPORTS

**Ector County**—Forest Development Corp.'s Edwards 1, 467 ft out of nec T&P sec 19, blk 43, T-3-2, lcn.

**Howard County**—R. M. Huff et al's E. W. Douthitt 1, swc nw W&NW sec 116, blk 29, lcn.

**Mitchell County**—Dockery & Robbins' Crawford-Shell 1, 330 ft out of swc lot 13, C. A. O'Keefe subd, machine.

**Presidio County**—H. D. Wilcox et al's C. E. Conring 1, 500 ft from n 2080 ft from e lines GH&SA sec 102, blk 4, lcn.

### COMPLETION

**Terrell County**—E. M. Thomasson Prod. Co.'s Graham-Bates 2, 600 ft from n 150 ft from w I&GN sec 30, blk 1, abnd 1531 ft.

## WEST CENTRAL TEXAS

### FIRST REPORTS

**Brown County**—H. T. B. Production Co.'s C. R. Smith 1, 150 ft out nwc s½ sec 3, H. P. Brewster sur 290, sp.

**Callahan County**—West Bros. et al's W. F. Evans 1, 350 ft from n 1750 ft from e of M. Anthony sur 767, lcn.

**Eastland County**—Jones-Stasney-Groover & Rose's McElreath 1, c sw H&TC sec 104, blk 3, sp.

**Parker County**—Wm. Holland & C. Leidecker's Lem Lamkin-Boyd 1, 467 ft out of nec s-100 ac sw¼ T&P sec 346, lcn 4500 ft test.

### COMPLETION

**Callahan County**—Ungren-Frazier & Beams Drl. Co.'s Jackson 1, sec sw T&P sec 85, blk 12, sand 920-26 ft, td 928 ft f&p 154 bbls initial.

## SOUTH TEXAS

### FIRST REPORTS

**Bexar County**—Roger Putnam's Conaway 1, 150-ac tr, John Lucas sur 154, 12 mi e San Antonio, 3 mi ne Eckart fld, sd 495 ft.

**Brooks County**—West Prod. Co.'s Cage 1, GC and SFRR sur 31, ab-283, 6 mi se Falfurrias, lcn.

**Duval County**—Frank Frohnhoefer's Carillo 1, 40-ac tr, sur 310, 8 mi w San Diego, lcn. Magnolia's Sinclair Heirs 1, A. B. & M. sur 510, 16 mi se Freer and on 2134-ac tr, lcn. M. L. Massingill and P. L. Keller's Peters 1, sw¼, sur 162, 24 mi nw Benavides, Sun farmout, lcn.

**Goliad County**—Tom Graham Oil Co.'s Wood 1, Domingo Morris sur, 16 mi nw Refugio, lcn.

**Hidalgo County**—Homper P. Lee et al's Yturria T & I Co. 2-A, 1000-ac lse, por 42, Juris of Reynosa, 13 mi nw Mission, 2733 ft w No. 1-A, mir.

**Jim Hogg County**—Humble's Mestina O. & G. Co. 3, swsd 5194-5205, crg 5820 ft.

**Jim Wells County**—H. H. Howell's San Antonio Joint Stock Land Bank 1, blk 14, sec 9, Scott's re-subdivision of the Benton Pasture, Antonio Longoria, M. Lopez gr, 5 mi s Bentonville, dr 5075 ft.

**Karnes County**—Hewit & Dougherty's Newberry 2, blk 25, Carlos Martinez gr, 300 ft nw Echols 1, Green area, lcn.

**LaSalle County**—Marshall Purvis' Yaeger (Marshal Purvis) 2, S½, lot 10, blk 8, sur 39, just n Adami fld, mi.

**Live Oak County**—Luling O. & G. Co.'s Northern Royalty Co. 1, G. H. & H. sur 1, 2½ mi sw Mikeska, lcn.

**McMullen County**—Jake Jarmon's Haytar 1, se¼, B. S. & F. sur 105, se/cor of county, lcn.

**Medina County**—John W. Dunca's Habey 1, 3½ mi s Dunlay, dr 390 ft.

**San Patricio County**—W. Stewart Boule's Hodges 1, 80-ac lse, 6 mi n Mathis, lcn.

**Victoria County**—Texas Gulf Prod. Co.'s Linnville 1, 60.7-ac lse, C. M. Creanor sur, 4000 ft sw discovery, Bloomington area, wor. O. N. Wisehart 1, e 40-ac, blk 35, Francisco Perez sur, 5600 ft ne discovery, Bloomington area, wor.

**Webb County**—Glenda Oil Co.'s Bruni Est. 1, blk 11, Eugene Garner subd of Reynosa Pasture, J. V. Borrego gr, 18 mi se Laredo, lcn. R. Saldivar 1, blk 5, Eugene Garner subd of Reynosa Pasture, sur 657, J. V. Borrego gr, 18 mi se Laredo, 5½-in csg 1001 ft, sd/o show 1001-08 ft, dr plugs 1008 ft.

**Wilson County**—Walter Nelson's Platner 1, T. F. L. sur 160, 2865-ac tr, lcn.

**Zavala County**—Wilcox O. & G. Co.'s Brown 1, James M. Polk sur 39, 2½ mi w Gillam 6, lcn.

### COMPLETIONS

**Live Oak County**—Smith & Storey's Lyne 2, A.C.H.Y.B. sur 163, 9 mi sw George West, sdy sh/oo 2513-37 ft, sd/oo 2538-46 ft, sw sd 2548-85 ft, sd/o and g o 2662-69 ft, top sdy sh and sh 3004 ft, abnd 3352 ft.

**McMullen County**—Rhea Nixon et al's Horton 1, James M. Jean sur 29, 4 mi se Tilden, 5½-in csg 650 ft, sd/o show 650½-56½ ft, Mirando 650½ ft, swbd sw/o show, abnd 666½ ft.

**Starr County**—Interstate Minerals' Green & Manning 1, blk 2, sh 85, por 81, Juris of Carmargo, 5 mi ne Rio Grande City, 5½-in csg 2604 ft, g sd 2600-2644 ft, td 2644 ft, comp 50,000,000 cu ft gas. Sun's Encarnacion Rodriguez 1, 642-ac lse, Santa Teresa gr, 5 mi ne Sun pool, 2½ mi sw Kelsey fld, td 7507 ft, comp flwd ½ BPH, 300 percent dist, 3/in-in ch, 840,000 cu ft gas, perf 6420-27 ft with 20 shots.

**Webb County**—Cash & Reynolds' DeSpain 1, se¼ of nw ¼ sur 17, abnd 2263 ft. Sinclair Prairie's Callaghan Land & Pastoral Co. 1, sec 585, 12 mi s and 6 mi s ne/cor of county, sd 5865-5903 ft, Carrizo 4000 ft, dst 5865-5900 ft failed, abnd 9501 ft.

**Zapata County**—O. W. Killam's Hinnant 4, sur 613, dst 1475-89 rec. 672 ft sw/gas show, ¼-in ch, 15 min, abnd 1697 ft.

## TEXAS GULF COAST

### FIRST REPORT

**Harris County**—G. F. Steger's Trahan 1, 4 mi se Humble, E. Ruhl Survey Abs 657, lcn.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Houston San Antonio New Orleans
*30 Years Experience*

# NOTES FOR THE Equipment Buyer and User

## Wire Line Wiper

**PATTERSON-BALLAGH CORPORATION**

A new all-rubber wire line wiper designed to remove excess mud cleanly, depositing it into the hole rather than dropping it to the rig floor, has been announced by Patterson - Ballagh Corporation, 1900 East 65 Street, Los Angeles.

**P-B Rubber Wire Line Wiper**

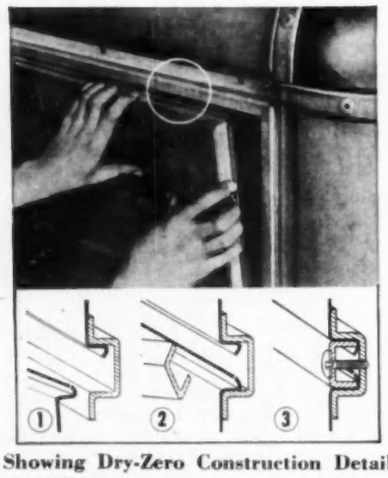
It has no metal to contact the line or to create a fishing hazard, and the wiper can be quickly removed and thrown to one side when the tool emerges. It consists of a heavy rubber sleeve and rubber flange or collar, integral. The sleeve is spirally split from the top to the bottom of the lower flange so that it can be distorted for insertion around the wire line. It is approximately 10 inches long by 4 inches in diameter, and weighs 5 pounds. When hooked into place, it is held in position by short pieces of line on each side holding the wiper with I-bolts.

## Buildings

**DRY-ZERO CORPORATION**

A new prefabricated all-steel industrial building, described as attaining extra structural strength and rigidity by pulling steel panel sheets into tension between the framing members, has been announced by Dry-Zero Corporation, Chicago.

Fabricated to specified dimensions, the buildings can be used for either temporary or permanent structures. Roofing and sides are built of patented panel sheets, framing members and fittings that can be assembled by unskilled workers with no other tools than a socket wrench.




**Showing Dry-Zero Construction Details**

The structure calls upon the steel in the panel sheets to contribute to structural strength. The sheets resist movement of the framing by means of a flange and tensioner that creates a union between sheets and framing that approximates the full strength of the sheet. The construction permits use of lighter gauge sheets and lighter framing.

The building may be dismantled as readily as it can be assembled, may be taken down and moved from place to place and rebuilt any number of times. It may be used for general industrial buildings, pump houses, meter houses, garages, warehouses, small shops, contractors shacks and freight houses.

## Pumping Packer

**LARKIN PACKER COMPANY**

A new hook wall pumping packer incorporating Neoprene for the packing element has been announced by Larkin Packer Company, St. Louis.

Use of Neoprene, an oil-resistant synthetic rubber, in design of the packer is to enable it to be reset many times despite continued contact with oil, water, gas, heat and pressure, and to resist deformation and eliminate the tendency to vulcanize to the casing.

When pulling or raising the packer, a steel ring is mechanically stretched away from its packed position to eliminate a swabbing effect. Other design improvements include a new spring, rein and slip assembly.

In addition to the regular style, the packer can be furnished with a control head assembly to provide a by-pass when running in a flowing or gassing well, or when pulling the packer from a hole full of fluid. The control head assembly, with a minor change, may be adapted to gas-lift installations.

**Larkin Neoseal Packer**

## Vinyl Resins

E. I. du Pont de Nemours & Company, Wilmington, Delaware, has announced distribution through its R.&H. Chemicals Department of a technical bulletin describing properties of a new group of water-soluble, water-dispersible vinyl resins. Designated by the company as PVA and described as polyvinyl alcohols, the resins can be molded, extruded or formed into sheets. Molded articles, such as sheets, gaskets, diaphragms, washers and tubing, are characterized by elasticity, toughness, flexibility and heat resistance, are described as impervious to action of oils, fats and most organic solvents.

## Drift Indicator

**EASTMAN OIL WELL SURVEY COMPANY**

A drift indicator utilizing light-sensitive paper that can be loaded and unloaded in daylight, eliminating development of photographic drift indicator records in solutions, has been announced by Eastman Oil Well Survey Company, Dallas.

Designated Type M, the instrument is described as small, compact and easily handled. Inclination of the well is recorded by a strong light beam directed through the plumb-bob onto the light-sensitive paper printed with concentric circles, each of which represents a degree.

The instrument is run into the well in a streamlined barrel on piano wire, sandline or dropped to bottom just before drill pipe is pulled to change bits. The barrels are supplied with interchangeable connections for all operations and are small enough to run through tool joints in 3½-inch regular API drill pipe.

The indicator, providing only the drift angle off vertical, furnishes a positive reading when the instrument is on bottom and quiet. If moving, a blurred or blank record will result and erroneous data may be detected.

**Eastman Drift Indicator**

## Motor Starter

**CUTLER-HAMMER, INC.**

Design improvements in its across-the-line starter for control and protection of polyphase squirrel cage motors up to 5 horsepower have been announced by Cutler-Hammer, Inc., 315 North 12 Street, Milwaukee.

The cover has been changed to a

**Cutler-Hammer Across-the-Line Starter**

# *The New Rotary Tool that "Stole the Show"...*

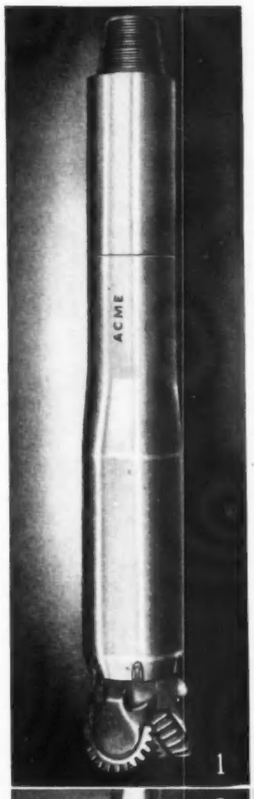
## *Acme's*
# *Mud Collar*

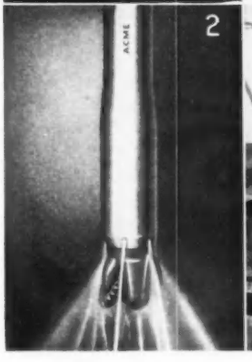
**Yes, Acme's MUD COLLAR was a big HIT at the Tulsa Oil Show! Rotary drillers, from everywhere, were eager to see and learn all about this "Modern-day Marvel." Amazed at its simplicity, they said, "Why hasn't it been thought of before?" But they were "sold" that it will do well the job for which it is designed.**

**If you missed the Show, or missed seeing Acme's new perfected, proven MUD COLLAR, write TODAY for complete information. A well illustrated, descriptive folder will tell you the story. No rotary driller can now afford to be "behind the times"—knowing that the MUD COLLAR is available, as the next step forward.**

**As pictured here, Acme's new "Wonder Tool" IS a COLLAR with rotary tool joint, used between the bit and drill collar. It houses a fluid "cylinder," from which 6 pressure streams flow over the bit, keeping it clean—preventing mud rings from forming. Delays in pulling out are thus practically eliminated. By keeping the bit clean, power consumption is reduced, cutting is faster, easier and smoother—making better hole, with less strain on drill pipe. All hazards of drilling—including time and money wasting fishing jobs—are greatly reduced.**

**Out in Illinois, where Acme conducted exhaustive tests, in perfecting the MUD COLLAR, the news "leaked out"—before we were ready to announce it. Many rotary drillers came—saw—and were CONVINCED. Their composite opinion was, "Acme has certainly found the answer to a long endured, tough, costly problem." Advance orders were booked. Now we are ready to GO.**



## Acme Fishing Tool Co.
**PARKERSBURG, W. VA.**

1. **Acme's MUD COLLAR—with bit assembled—ready to go into trouble-preventing, profit-protecting service.**
2. **Acme's MUD COLLAR "in action." 6 Fluid streams keep bit clean.**
3. **Acme's MUD COLLAR on the job—it has just come from hole "as clean as a whistle."**
4. **Mud rings, like this, are "going out of style"—with Acme's MUD COLLAR.**

(Patents Applied For)

# GET ACCURATE PRESSURE READINGS
## *This Sure, Easy Way*

**This is the pressure gauge which tells you in sign-board figures your exact pressure at all times on your mud, water, oil, gas, or any liquid line. Because movement of the dial is minimized, a steady reading is easy at a glance from 30 feet away. It employs no Bourdon tube and screws directly on the line. The self-contained diaphragm prevents line fluid from entering any part of the gauge mechanism. The gauge is not affected by external vibrations, and pump pulsations are dampened over the entire pressure range without adjustments. It was designed and constructed specifically for oil field drilling and similar service, and has definitely taken pressure gauging out of the delicate instrument class.**

Available in following pressure ranges:

**Pounds Per Square Inch**

| | | |
|---|---|---|
| 0-1000 | 0-3000 | 0-5000 |

**Kilograms Per Square Centimeter**

| | | |
|---|---|---|
| 0-70 | 0-210 | 0-350 |

**Atmospheres**

| | | |
|---|---|---|
| 0-70 | 0-210 | 0-350 |

**ABERCROMBIE PUMP CO., Gulf Bldg., Houston, Texas**

**ABERCROMBIE PRESSURE GAUGE**

*Streamlined*

**BROWN RELEASING SPEAR**

Streamlined to minimize fatigue failures (crystallization) in the hole. Carefully inspected through every step from the raw material to the finished tool, and rechecked following every job to insure against costly failures. Unfailing performance has put it on jobs everywhere.

BROWN OIL TOOLS, INC.
HOUSTON, U. S. A.



An A.A.P.G. Book (1939)

**Recent Marine Sediments**

A SYMPOSIUM OF 34 PAPERS BY 31 AUTHORS

Edited by PARKER D. TRASK
U. S. Geological Survey, Washington, D. C.

Prepared under the Direction of a Sub-Committee of the Committee of Sedimentation of the Division of Geology and Geography of the National Research Council, Washington, D. C.

Carl W. Correns, Stina Gripenberg, W. C. Krumbein, Ph. H. Kuenen, Otto Pratje, Roger Revelle, F. P. Shepard, H. C. Stetson, Parker D. Trask, Chairman

This book is on the topic of Sedimentation and Environment of Deposition recently voted No. 1 in geological research of most importance to the progress of petroleum geology—in a poll of the 3,000 A.A.P.G. members and associates, conducted by the Research Committee. Throughout the book, the basic data — observational facts — are emphasized rather than speculative inferences.

- 736 pages; 139 figures
- Bibliographies of 1,000 titles; 72 pages of author, citation, and subject index
- Bound in blue cloth; gold stamped; paper jacket; 6 x 9 inches

PRICE: $5.00, POSTPAID

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THE AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS
Box 979, Tulsa, Okla., U. S. A.


# NOTES FOR THE Equipment Buyer and User

hook-on type held by one fastening screw which can be removed for easy installation. It is designed to permit group panel mounting with minimum clearance between adjacent starters, and the interior of the case is finished in light aluminum to facilitate wiring and inspection in poorly illuminated locations.

Loosening one screw permits removal of the operating mechanism for easy wiring and conduit work. The contacts are made of heavier fine silver. Lava insulators protect contact springs against heat transmission to insure full contact pressure at all times. The contact springs and contact supports are made of stainless steel, while other metal parts are cadmium plated. The over-load relay has been made smaller and more accessible.

The starter is available with reset only for 2- or 3-wire remote control, with start and stop buttons for 3-wire control, and with three position selector switch for manual-off-automatic local control or 2- or 3-wire remote control. Enclosures include general purpose, water-tight, dust-tight and Class I-D or II-G. The starter is also available in open panel type for cavity or built-in mounting.

## Brake Block

**STANDCO BRAKE LINING COMPANY**

A woven brake block without metallic content designed to handle large braking loads in deep drilling without scoring brake rims has been announced by Standco Brake Lining Company, 2701 Clinton Drive, Houston.

**Cross-Section Standco Brake Lining**

The brake block features a wire reinforcement woven into the brake lining during manufacture. It occupies one-fourth of the thickness of the brake block, described as just enough for flat-head brass screws to get a strong hold and eliminating the possibility of scoring rims. The wire reinforcement is designed to prevent the brake lining from working loose on the screws.

## Immersion Heaters

General Electric Company, Schenectady, New York, has issued a 4-page bulletin, GEA-214D, on calrod immersion heaters. It gives specifications and prices of various-sized units for heating water, non-circulating oils and for circulating oils. Operation, installation and application data are also given.

## Telescopic Derrick

**WILSON MANUFACTURING COMPANY**

A telescopic derrick with four legs of heavy seamless steel tubing, which when extended raises the center of the sheaves 85 feet above the base level and when telescoped is 39 feet long, has been announced by Wilson Manufacturing Company, Wichita Falls, Texas.

**Wilson Telescopic Leg Derrick**

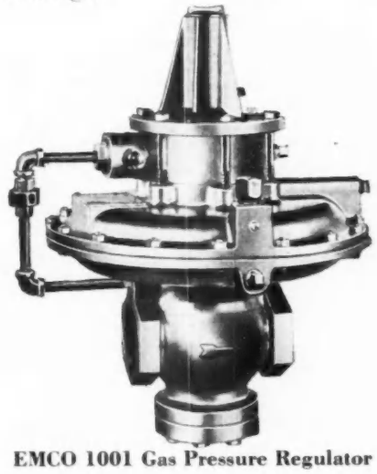
The derrick is transported in two sections. The main unit is carried on top of the winch or rig unit and can be raised with power furnished by the winch drums. The racking platform is carried up by the main telescopic legs and raised slightly above the horizontal position by a line from one drum, while the two auxiliary telescopic legs are raised and telescoped by the other drum. The racking platform is then lowered onto the auxiliary legs Two brace supports are then placed between the outer end of the racking platform and the top of the derrick with the aid of a cat line, two girts are put in at about the 30-foot level, and eight turnbuckle braces are fastened.

# NOTES FOR THE Equipment Buyer and User

## Pressure Regulator

**PITTSBURGH EQUITABLE METER COMPANY**

A gas pressure control regulator designed to provide accurate control for installations having both small and large flow rates, where supply pressures ranging up to 150 pounds must be reduced to 20 pounds or less, has been announced by Pittsburgh Equitable Meter Company, 400 North Lexington Avenue, Pittsburgh.



**EMCO 1001 Gas Pressure Regulator**

Designated EMCO 1001, the regulator features a pilot loading system for diaphragm control to assure movement of the main operating diaphragm with a change in control pressure. The principal is described as assuring maintenance of the desired pressure at a definite and unvarying amount from minimum flow rates to the maximum capacities which can be obtained under the existing pressure conditions.

It is designed for large gas appliances, boiler plants and industrial heat-treating furnaces.

## Alleviator

**SULLIVAN MACHINERY COMPANY**

An alleviator for attachment to beam-type pumping rigs designed to reduce pumping costs has been announced by Sullivan Machinery Company, Michigan City, Indiana.

**Sullivan Alleviator Installation**

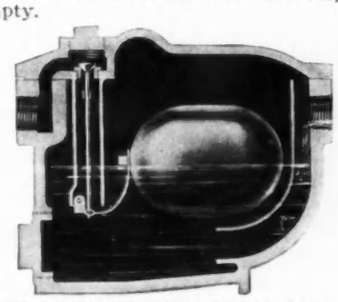
It is a pneumatic cylinder-and-piston assembly for connecting beam and rod string in place of the usual rigid connection. The cylinder hangs on the beam and the piston is attached to the polish rod, floating the rod string to maintain a uniform upward working load. The alleviator is designed to evenly distribute pumping effort over the entire stroke, reducing peak loads, rod breakage and shock on the rig.

## Air Line Trap

**WRIGHT-AUSTIN COMPANY**

A new trap for draining moisture and oil from compressed air equipment has been announced by Wright-Austin Company, 315 West Woodbridge Street, Detroit.

The trap is designed to handle thick oily emulsion from cylinder lubrication satisfactorily because of a large outward opening valve, and to operate from a closed position without priming as the valve is closed when the trap is empty.



**Wright-Austin Trap for Air Lines**

The valve opens outward, above the seat and in the same direction as the outgoing flow of condensate, to permit a large orifice that will promote a free flow of cold gummy oil in the water from the compressed air without choking up the trap.

The trap is of the float type. Working parts are removable by lifting the cover. It is unnecessary to break inlet and outlet connections.

## Diesel Power Units

**INTERNATIONAL HARVESTER COMPANY**

Three new Diesel power units, styled after the recently-announced Model UD-18 100-horsepower engine, have been announced by International Harvester Company, 180 North Michigan Avenue, Chicago. Model UD-6, smallest in the new line, is rated at 39 horsepower at 1500 r.p.m.; Model UD-9 is rated at 53 horsepower at 1500 r.p.m., and Model UD-14 is rated at 66½ horsepower at 1300 r.p.m.

The engines start on gasoline, and after a minute or less of operation shift to Diesel operation. Spark plugs, carburetor and auxiliary combustion chambers used on the gasoline cycle are shut off and have no connection with operation when the change-over is made. They may be cranked with hand, or equipped with a standard 12-volt electric starting system.

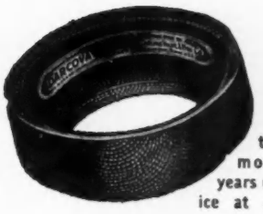
They have four-cycle, valve-in-head de-


**Buy these Original Composition Valve Cups on the Basis of ....**

PRECISION *in Manufacture*

*Thorough* INSPECTION

ACCURACY *in size designation*



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(Orange Label) the standard for more than thirty years under severe service at all depths.

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**DARFLEX**
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We take **pride** in a record of over 30 years in giving the oil trade absolutely dependable valve cups. We **know** it is a record you can **profit** by!

DARCOVA Pumcups for Pumps

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*to*
**MURRAY**
*for solution!*

**Murray's years of specialized experience in moulding both natural rubber and oil-resisting neoprene parts for oil tools has helped many a manufacturer solve his rubber problems. Perhaps Murray can help you, too.**

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**REX PRE-HEATER**

**Reduces Boiler Maintenance!**

**Keeps boiler tubes cleaner, thus increasing efficiency and reducing boiler maintenance. For complete details see Pages 2146-2147 of your Composite Catalog.**

**THE REX COMPANY**
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California Distributor: The Howard Supply Co.

# NOTES FOR THE Equipment Buyer and User

sign, cylinders with full-length jackets, pressure lubrication through drilled passages, oil pumps with Floto screen, Toccohardened crankshafts, heavy-duty precision bearings, by-pass type thermostatically controlled cooling, full-floating water pump shafts, full-floating piston pins, variable-speed governors, oil-bath type air cleaners, renewable element oil filters, and equipment combinations to meet a variety of requirements.

The UD-6 has 3⅞-inch bore, 5¼-inch stroke, and piston displacement of 247.7 cubic inches. Its length is 62-9/16 inches, width 25⅜ inches, height 50¼ inches, and weight 1765 pounds.

The UD-9 has 4.4-inch bore, 5.5-inch stroke, and piston displacement of 334.5 cubic inches. Its length is 67¾ inches, width 26⅞ inches, height 52 inches, and weight 2085 pounds.

The UD-14 has 4¾-inch bore, 6½-inch stroke, and piston displacement of 460.7 cubic inches. Piston speed at 1300 r.p.m. is 1408 feet per minute. Its length is 78 inches, width 33⅛ inches, height 56½ inches and weight 2585 pounds.

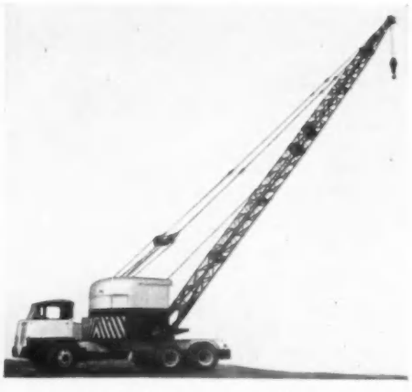
## Revolving Crane

**THE THEW SHOVEL COMPANY**

A full revolving crane, convertible to shovel, dragline, clamshell or backdigger and mounted on a 10-wheel, rubber-tired mounting, has been announced by The Thew Shovel Company, Lorain, Ohio.

Designated Moto-Crane, the unit is designed for high-speed mobility in getting from job to job. The carrier has 3 axles supported on 10 rubber tires, with drive on both tandem rear axles; a 175-inch wheelbase and steering gear built for soft ground travel; 10 speeds forward, including high at 28 to 31 miles an hour, and two speeds reverse; offset cab to permit carrying boom in lower traveling position over front end; rocker arm rear end to replace springs and give flexibility for road travel and rigidity for operation, and space for groundman, tackle and rigging.

The crane is available in five models, ranging from units in which minimum total weight is the main objective up to big-capacity, heavy-duty units to carry 100-foot and longer booms.



**Thew Shovel Company's Moto-Crane**

## Braided Packing

**THE GARLOCK PACKING COMPANY**

A new braided packing, designated Lattice-Braid, designed to provide controlled porosity with every braiding strand passing diagonally through the body of the packing at an angle of approximately 45 degrees, has been announced by The Garlock Packing Company, Palmyra, New York.

The packing is described as braided internally as well as externally, as having no strands in the packing that are not part of and integral with the entire body of the packing, and as presenting a structure in which every braided strand contributes to the strength of the entire mass.

**Garlock Lattice-Braid Packing**

Available in five styles, No. 730 is recommended for service on shafts of centrifugal and rotary pumps handling hot or cold water, caustic solutions or weak acids; No. 731 is recommended for service on rods operating against steam, gas, acids, lye and caustic soda solutions; No. 732 is recommended for heavy duty service against high pressure steam or hot oil; No. 736 is recommended for service on shafts of centrifugal or rotary pumps handling acids or strong chemical solutions, and No. 751 is recommended for application to shafts of centrifugal or rotary pumps handling cold oil or water.

## Circuit Breakers

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pennsylvania, has issued an 8-page leaflet, designated No. 33-555, describing its Type F-75 indoor oil circuit breakers with interrupting capacities of 75,000 KVA. The equipment is designed especially for use in generating stations and industrial plants where minimum space is available for switching equipment. They may be operated either manually or electrically, and are available in ratings of 600, 1200 and 2000 amperes, at voltages of 15,000, 7500 and 5000 volts, respectively.

# NOTES FOR THE Equipment Buyer and User

## Valves

**THE ALBRIGHT EQUIPMENT COMPANY**

A new series of valves, designated Hydra, for use on oil, steam and water lines having pressures up to 4000 pounds, has been announced by The Albright Equipment Company, 934 Crafts Building, Pittsburgh.

The valves operate with a one-eighth turn, four stainless steel balls that close the valve engaging into port holes due to pressure on the line. There are no valve seats. The valves may be operated by hand or by electric solenoids with push-button control.

Made in brass, bronze and steel bodies, they are available in ½-, ¾-, 1-, 1¼-, 1½- and 2-inch sizes.

**Albright Equipment Company's Hydra Valve**

## Vinyl Resins

E. I. du Pont de Nemours & Company, Wilmington, Delaware, has announced distribution through its R. & H. Chemicals Department of a technical bulletin describing properties of a new group of water-soluble, water-dispersible vinyl resins. Designated by the company as PVA and described as polyvinyl alcohols, the resins can be molded, extruded or formed into sheets. Molded articles, such as sheets, gaskets, diaphragms, washers and tubing are characterized by elasticity, toughness, flexibility and heat resistant, are described as impervious to action of oils, fats and most organic solvents, including chlorohydrocarbons, aromatic hydrocarbons, carbon disulphide, alcohols, esters or keytones, and to deterioration caused by vibration and flexing.

## Nickel Uses

The International Nickel Company, 67 Wall Street, New York, has issued a 16-page pocket-size booklet on "Seven Minutes With Seven Metals" giving uses and properties of nickel and high-nickel alloys. Edited for both technical and non-technical readers, the publication includes three pages devoted to detailed tables on mechanical, chemical and physical characteristics of nickel, monel, inconel and associated alloys.

## Trucks

Marmon-Herrington Company, Indianapolis, Indiana, has issued an 8-page folder describing uses of its all-wheel-drive trucks in the oil industry. Illustrated are units used for heavy-equipment hauling, and portable drilling machines. The firm's line includes 33 models with rated gross load capacities up to 70,000 pounds.

## Time-Delay Relays

General Electric Company, Schenectady, New York, has issued leaflet GEA-2902B giving construction details, operation data and general information on its vacuum-tube time-delay relay. Typical applications of the instrument listed include centrifuge control, laboratory tests, process furnaces and sign flashers.

## Harbison-Walker Purchases Athens Brick & Tile

Harbison-Walker Refractories Company, Pittsburgh, has announced the purchase of the Athens plant of Athens Brick & Tile Company, Athens, Texas.

Coleman brand of fireclay brick will continue to be made and headquarters of the sales department for the district will be maintained at Athens.

A LINE SCALE affords you . . .
• GREATER ECONOMY
• SUPER SENSITIVITY
• PROVED ACCURACY
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Pioneers of "weighing the load in pounds"

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REED'S 'B-R' DRILLING BIT WITH WIRE LINE RETRACTABLE CORE BARREL

ANY NUMBER OF CORES CAN BE TAKEN (REGARDLESS OF DEPTH) WITHOUT REMOVING THE DRILL PIPE

HARD FORMATION HEAD (Interchangeable with Soft Formation Head)

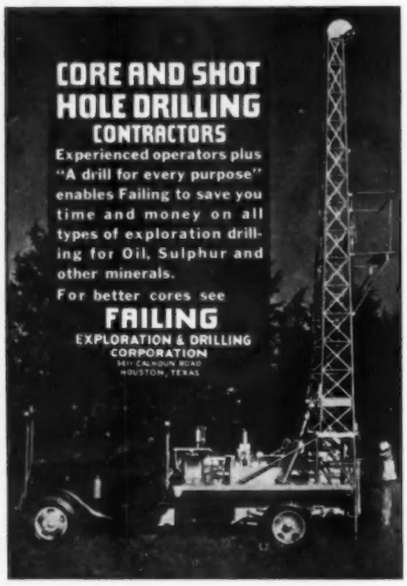
REED 'B-R' Drill Collar and 3-Blade Drilling Bit with Core Barrel in position

REED ROLLER BIT CO.

WEST TEXAS OPERATOR SPEEDS PARAFFIN CLEANING WITH OTIS WIRE LINE PARAFFIN SCRAPER

An operator in the Odessa, Texas field tells us he is delighted with the savings he is effecting by using the Otis Wire Line Paraffin Scraper. He is now able to clean 5 wells a day in comparison with 2 or 3 by other paraffin removing methods. Another attractive feature of the Otis Wire Line Paraffin Scraper is that it cleans heaviest paraffin deposits without stopping well flow. Comes complete with wire line socket, stem and stroke jars, choice of two type cutters.

WRITE OTIS TODAY
PRESSURE CONTROL INCORPORATED
DALLAS, TEXAS


CORE AND SHOT
HOLE DRILLING
CONTRACTORS
Experienced operators plus "A drill for every purpose" enables Failing to save you time and money on all types of exploration drilling for Oil, Sulphur and other minerals.
For better cores see
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**TIN END ENVELOPES**
*for Sand Samples*

Made of strong kraft paper, tightly sealed to eliminate leaks. Top end folds over with easy twist and holds contents securely. Most economical for sending and filing of sand samples. Phone, write or wire for our low prices.

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**Standco**
NO-SMOKE
**STANDCO BRAKE LINING**
Stands the gaff and gets the job done without scoring brake rims. See page 2100 Composite Catalog.
**Standco Brake Lining Co.**
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# NOTES FOR THE Equipment Buyer and User

## Hale Named Air Reduction Company Purchasing Agent

C. R. Hale

C. R. Hale has been appointed purchasing agent of Air Reduction Company, 60 East 42 Street, New York, and its subsidiary and affiliated companies. A Columbia graduate, he joined the purchasing department of the company in 1925 and has been assistant purchasing agent since 1936. He succeeds H. M. Daggett, who has retired.

## Universal Oil Tool Company Organized at Houston

Universal Oil Tool Company has been organized with headquarters in Houston to engage in controlled directional drilling, sidetracking and hole straightening.

Organizers of the firm are Guy Brown and Joe Gates, and field engineers include Louis Munsey, Johny Cochran, Ralph Clevenger and Melvin Giles. The personnel includes men who have been working with the Lewis knuckle-joint since development of the tool.

## Jones & Laughlin Names Assistant Managers of Wire Sales Division

Establishment of two new assistant managers of wire products sales with appointment of D. J. Henecker for wire rope and C. E. Kendall for wire and galvanized sheets, has been announced by Jones & Laughlin Steel Corporation, Pittsburgh. The wire rope sales division has been consolidated with the wire products division under J. E. Timberlake, present manager of wire products sales.

Henecker has been associated with the wire rope industry since 1922 when he was employed in the New York warehouse of American Steel & Wire Company. He advanced through various positions, his work taking him to the Southern territory and to Buffalo until 1930, when he was appointed manager of wire rope promotion sales in New York. A year later, he was made assistant sales manager of the eastern division. In 1932 Henecker joined the sales force of Wickwire Spencer Steel Company as assistant manager, and later became sales manager of the Buffalo district. In 1937, he was appointed general manager of wire rope sales for the United States, and, in addition in 1939, became sales manager for all products of the eastern district, which position he held when joining Jones & Laughlin Steel Corporation.

D. J. Henecker

Kendall has been with the company in the wire sales department since February, 1939, having been prior to that manager of merchant product sales for Pittsburgh Steel Company. Practically his entire business experience has been with Pittsburgh Steel Company, having started in 1919 in the Chicago office. In 1923, he became assistant manager of that office, which position he held until 1928 when he was transferred to Pittsburgh as assistant manager of the fence department. He was made manager of that department in 1930. In 1935, he became manager of the merchant products sales department at Pittsburgh, the position he held before coming to Jones & Laughlin Steel Corporation.

C. E. Kendall

## W. L. Batt Guest Speaker at Industrial Advertising Conference

William L. Batt, president of SKF Industries, Inc., Philadelphia, was guest speaker at a luncheon held in New York last month by the Technical Publicity Association in connection with a celebration of the association's thirty-fifth anniversary.

"Business alone can save the private and check the trend property system toward totalitarianism," said Batt in discussing the subject of "Industry's Selling Job." "Business must retain the leadership that belongs to it, win back whatever public confidence it may have lost, and show the American people that its greatest good lies, not down the road of more and more control by government, but down the road of private enterprise."

W. L. Batt

The theme of the conference was "How Industrial Advertising Can Reduce the Cost of Selling," and was discussed from four different points of view at seminars conducted by Charles McDonough, Combustion Engineering Company; W. V. Merrihue, General Electric Company; C. C. Chamberlain, Jenkins Bros., and R. A. Wheeler, International Nickel Company.

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Gerald E. Stedman has been named sales manager of the Rego Division of Bastian-Blessing Company, 242 East Ontario Street, Chicago, according to announcement of Ellsworth L. Mills, vice president in charge of sales.

# NOTES FOR THE Equipment Buyer and User

### Bethlehem Motion Picture to Show Making of Wire Rope

Bethlehem Steel Company, Bethlehem, Pennsylvania, is completing an industrial motion picture on the making and use of wire rope. With acquisition in 1937 of Williamsport Wire Rope Company, Williamsport, Pennsylvania, now the Williamsport Division, Bethlehem Steel Company became one of the few manufacturers of wire rope having its own steel-making facilities.

Beginning with the handling of the iron ore, the new picture, "Sinews of Steel," will show the principal operations in steel making, placing particular emphasis on the fact that steel for wire rope is made especially to meet the requirements of that product. The rolling of rod from the billet on high-speed continuous mills and the processing of rod into wire for making into wire rope are covered in detail. Close-ups and sectional views show the drawing of wire to the smallest sizes.

The principle of wire rope making is shown in sequences taken in the rope mill, where the course of the wire is followed as it is formed into strand, and the strand into rope. By means of close-ups and engineering drawings, intricacies of wire rope engineering are touched on in an effort to make the picture as good a source of information on the subject as is possible. Illustrations of the many uses to which wire rope is put in industry are also included.

"Sinews of Steel" will be a sound film, four reels in length and in 16-mm size. It is being made for presentation at meetings of jobbers and dealers, technical societies, trade associations, and college and representative civic groups.

### Yale & Towne Names S. W. Gibb Philadelphia Division Sales Head

The Yale & Towne Manufacturing Company has announced promotion of S. W. Gibb to the position of general sales manager of the Philadelphia Division. He succeeds James C. Morgan, who stepped up to the post of general manager of all Philadelphia operations.

S. W. Gibb

Joining the company in 1920 as district sales manager, Gibb operated from Pittsburgh headquarters for the next several years. In 1929, he was promoted to Pacific Coast sales manager, and in 1931 was made assistant sales manager for the materials handling division at Philadelphia. In his nine years as assistant general sales manager, he established the company's countrywide distributor organization.

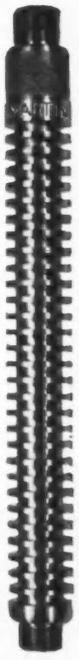
### General Paint Corporation Names Cluff Mid-Continent Sales Head

William D. Teubner, vice president and general manager for General Paint Corporation, has announced the appointment of E. R. Cluff as general sales manager for the Mid-Continent division.

Cluff, who will make his headquarters at Tulsa, joined the company 11 years ago at San Francisco, and since served as sales manager for the central division.

Hill, Hubbell & Company, a division of General Paint Corporation, erected


One Piece Body and Split Ring Secret of MARTIN PLUNGER SUCCESS



Martin Plunger Body without Rings

Deep wells and high pressures present no problem for Martin Plungers. Rigidity of machined body and tough wearing surface of rubber and fabric rings insure long life and true plunger pumping action.

OTHER REASONS WHY

- No chance for fluid passing and cutting underneath the rings.
- Precision Rings, compensated so that all rings come out to a uniform fit in the barrel.
- Made in different lengths for different well depths so that same excellent results can be obtained in any depth well.
- Work equally well in oil or water wells.

SOLD ONLY THROUGH SUPPLY STORES

See Composite Catalog, Page 1562

Field Representatives:
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Tom Hulett, El Dorado, Ark.
C. J. Baeten, Eldorado, Kansas
Harvey J. Stone, Wichita Falls, Texas
Claude Wilmeth, Kilgore, Texas
Oris Orton, Cushing, Okla.

JOHN N. MARTIN Manufacturer
11 W. Brady St. Tulsa, Okla.



For QUICK, ACCURATE TESTS Use CURTIN CENTRIFUGES

No. 3420...15 c.c. machine. Cranks and heads interchangeable with 100 c.c. machines.

Simple in design . . . Ruggedly built . . . Require no special care . . . Gear Ratio and throw of crank produce required speed with no strain. Curtin Centrifuges meet all A.S.T.M. STANDARD METHOD D-96-35 and A.P.I. CODE NO. 25 requirements. Full descriptive literature upon request.

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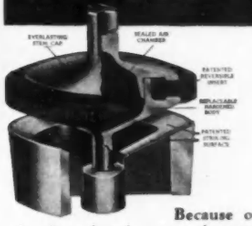
HOUSTON U·S·A TEXAS



For Month In - Month Out Service
USE MacCLATCHIE "AIRFLOTE" MUD PUMP VALVES



Because of the sealed-in air chamber that increases buoyancy . . . cuts fluid slippage . . . reduces impact . . . and gives more efficient valve action, MacClatchie "Airflote" Pump Valves insure superior performance and longer life under the toughest pumping conditions. Replaceable bodies, reversible inserts and everlasting stem caps give true MacClatchie economy.

MacClatchie "Streamlined" Pump Valves give you *high* quality at *lowest* cost! Of solid one-piece construction, they're streamlined at every point to assure unobstructed fluid flow. Valve Seats (interchangeable with "Airflotes") have 20% to 100% more striking surface than others, PLUS patented cross-bar construction.

All MacClatchie Valves are guaranteed against cutting out the pump. *See our representative or write direct to factory for details on this guarantee.*

MacCLATCHIE MANUFACTURING CO.
COMPTON, CALIFORNIA

# NOTES FOR THE Equipment Buyer and User

a plant at Tulsa 20 years ago to serve the petroleum and building supply industries in the Mid-Continent.

E. R. CLUFF

### Procedure Handbook of Arc Welding Design and Practice

The sixth edition of "Procedure Handbook of Arc Welding Design and Practice," authored by A. F. Davis, has been issued to include new data essential for most efficient use of arc welding in its varied applications. It embodies results of two years of fact-finding by a staff of 200 arc welding application engineers contacting industries throughout the world.

Encyclopedic in scope, concisely written and profusely illustrated, the handbook is a complete arc-welding reference guide. Written especially for use of designers, engineers, architects, production managers, welding supervisors and operators, it contains a wealth of data of interest to engineers, designers, architects, draftsmen, steel fabricators and erectors, foremen, cost estimators, maintenance managers, shipbuilders, piping and pipe-line contractors, job welders, welderies, repair shops and students of welding.

Eight sections cover the following subjects: welding methods and equipment; technique of welding; procedures, speeds and costs for welding mild steel; structure and properties of weld metal; weldability of metals; designing for arc-welded steel construction of machinery, designing for arc-welded structures, and typical applications of arc welding in manufacturing, construction and maintenance.

The book, which contains 1125 pages and 1557 illustrations, may be obtained from the Book Department of The Gulf Publishing Company, Houston, at $1.50 a copy.

### Wilfred A. Clabault, Roller-Smith Company Advertising Manager

Roller-Smith Company, Bethlehem, Pennsylvania, manufacturers of electrical measuring and protective devices, has announced the appointment of Wilfred A. Clabault as advertising manager.

Clabault, who also will be engaged in sales, formerly was a member of Westinghouse Electric & Manufacturing Company's advertising department. Born in New York, in 1927 he graduated from Tufts College, Medford, Massachusetts, with a degree in electrical engineering. He joined Westinghouse Electric & Manufacturing Company as a graduate student in July of that year, and in 1928 entered their advertising department where he has handled promotional activities on a number of products sold to the central station and industrial fields.

---

William H. Quinn, New York district manager for Chain Belt Company, Milwaukee, died suddenly May 5 in New York City. He had been with the company since 1923, and manager of the New York office since 1928.

Adv.

"Our driller wants 6000 feet of straight hole, the kind the Sievers Reamer makes!"

OUTLASTS 3 to 4 Times

Less than 1½ years have passed since, in the pages of the Oil Weekly, we publicly announced the

B-M-W 2-WAY NON-MAGNETIC Crown

It has now been in use in thousands of wells and is daily proving that it is an "exceptional crown," as expressed by one user. There are four outstanding reasons why it is so well liked:

1—It is so designed that the ball cannot wallow out the wings;
2—The ball does not stick in the top of the crown from paraffin or any other cause;
3—It overcomes the effects of lodestone;
4—It regularly outlasts the standard pattern crown three or four times.

*Complete data on request. See our ad in the latest Composite Catalog.*

B-M-W 2-WAY NON-MAGNETIC Crowns, as well as other B-M-W Products, are sold by the leading supply stores.

BRADFORD MOTOR WORKS INC
OIL WELL SUPPLIES
BRADFORD, PA. — TULSA, OKLA.

# Squeaks from the Bull Wheel

### She Spoke Out of Turn

While his mother was away on a visit, little Willie's nurse took him over to see his two old maid aunts.

"And how do you like living alone with your daddy?" asked one. "Do you hug him and kiss him?"

"Oh, yes," said the little fellow. "Me hugged and kissed daddy last night." "That's wrong," his nurse corrected him, "you should say 'I hugged and kissed daddy last night.'"

"No, nursie," said Willie, "that was Friday night."

### That's the Difference

"I knew an artist who painted a cobweb so realistically that the maid spent several hours trying to get it down from the ceiling."

"I just don't believe it."

"Why not? Artists have been known to do such things."

"Yes, but not maids."

### Decidedly Not

A man went to a secret service agency to report the disappearance of his wife. After a few days the agency announced that they thought they had found her.

"What did she say?"

"Nothing."

"Then it wasn't my wife."

### Practical Demonstration

"Now boys," said the teacher, "I want each of you to write a composition on the subject 'What I Would Do If I Had Fifty Thousand Dollars.'"

One youth sat idle until the papers were called for, when he turned in a blank sheet.

"What does this mean?" demanded the teacher sternly. "Where is your composition?"

"That's it," answered the boy; "that's what I'd do if I had fifty thousand dollars."

### Tough Customer

A backwoods woman, the soles of whose feet had been toughened by a lifetime of shoelessness, was standing in front of her cabin fireplace one day when her husband addressed her: "You'd better move your foot a mite, maw, you're standin' on a live coal."

Said she, nonchalantly, "Which foot, paw?"

### Something to Anticipate

A doctor was questioning a driver pinned under his car in an accident.

"Are you married?'

"No. This is the worst fix I was ever in."

### Careless About His Health

"Why did Mrs. Jones divorce her husband?"

"Because he was afraid of catching a cold."

"But that's no ground for divorce."

"It was in that case. He came home with a silk stocking around his neck instead of his muffler."

### So It Seems

"Hats cost more than radios."

"What makes you think so?"

"Well, a sign in a window back there said 'Hats, $10 up,' and we just passed another window with a sign that says, 'Radios, $10 down.'"

### Playing Safe

"I know why a writer calls himself 'we.'"

"Why?"

"So the man who doesn't like the article will think that there are too many for him to lick."

### Big Job

"Shine, please, boy," said the six-foot-five soldier to the shoeblack.

The boy looked down at the vast expanse of boot before him.

"Bert," he called out to another shine boy, "Gimme a 'and—I've got an army contract."

### No Bench

"It's really too silly, this publicity seeking."

"What's the trouble?"

"Trouble? Look at this newspaper. It says Judge Hankins announced yesterday that he would not sit for a month."

### Nothing to It

"Sculpture is very easy, isn't it?"

"Very, very easy. You just take a block of marble and a chisel and knock off all the marble you don't want."

### Educational

"Yes, stamp collecting is educational," said the fond mother to the visitor. "For instance, where is Hungary, son?"

"Two pages in front of Italy."

### Eager Volunteers

"Say, how is it that you seem to have so many Scotsmen among your pilots?"

"Well, sir, since the Scots have learned that every cloud has a silver lining, we can't keep 'em out."

### One Way

It costs seventy-five cents to talk to Bloomfield.

Can't you make a special rate for just listening? I want to call up my wife.

### No Wonder

I went in a store with my girl to get some pins and was embarrassed beyond belief.

What kind of pins?

Stepins.

### Oh!

I can't go to the masquerade with Joe.

Why not?

I'm going in my Hawaiian costume and he's going as a harvest hand.

### Not Sectional

I hear Jack is in love with a girl on the West Side.

No; he loves her all over.


CLEAN-OUT Old Wells WITH A MILLER

In time your wells fill with sand and sediment, decreasing production. Give your wells NEW life by cleaning-out with a MILLER — the Sand Pump in World-Wide use.

The MILLER is made in diameters of 2½, 3, 3½, 4, 4¼, 5, 5½, 7 and 9 inches and lengths of 20, 25 and 30 feet. 5/32-inch wall thickness in REGULAR Type, ¼-inch wall tubes HEAVY DUTY Sand Pumps.

INTERCHANGEABLE BOTTOMS
*To Meet Every Condition*

- BAILER BOTTOM — With the Bailer Bottom installed the MILLER is quickly changed to a Bailer giving you a combination of either Bailer or a Sand Pump in one tool.
- SAND BOTTOM — Used when tools are run and when well is shot to quickly remove loose material.
- STAR BOTTOM — Used for cutting the sand loose.
- CHISEL BOTTOM (In Pump) — With this bottom tightly packed sand can be easily broken in small pieces so it can be picked up in the pump.

*Write for Descriptive Folder and Price List*

See Pages 1672-73 COMPOSITE CATALOG

MILLER Sand Pump Co.

PATENTED NO. 1870340 NO. 1923600 NO. 1707090 NO. 1902626 NO. 1966626 NO. 2059067

*General Offices and Factory:*
OKLAHOMA CITY, OKLAHOMA
1524 S. E. 29th P.O. Box 4516 Tel. 7-6884

Branches:
SAPULPA, OKLAHOMA—Tel: 341
KILGORE, TEXAS—Tel: 545

FOR SALE BY SUPPLY STORES EVERYWHERE

# INDEX TO ADVERTISERS

***Indicates that detailed information on the manufacturer's products or services may be found in the 1940 edition of the Composite Catalog of Oil Field & Pipe Line Equipment.**


**A**

| | Page |
|---|---|
| *Abercrombie Pump Co. | 81 |
| *Acme Fishing Tool Co. | 81 |
| Acme Gas Lift Co. | — |
| Air Reduction Sales Co. | — |
| *Ajax Iron Works | — |
| *Alten's Foundry & Machine Works | — |
| *Aluminum Company of America. | Third Cover |
| Aluminum Ore Company | — |
| American Askania Corp. | — |
| American Assn. of Petroleum Geologists | 82 |
| *American Cable Division of American Chain & Cable Co. | Second Cover |
| American Cast Iron Pipe Co. | — |
| *American Hammered Piston Ring Division of Koppers Co. | — |
| *American Iron & Machine Works Co. | — |
| *American Manganese Steel Division of The American Brake Shoe & Foundry Co. | — |
| *American Meter Co. | — |
| *American Sand-Banum Co. | — |
| *American Steel & Wire Co. | — |
| Atlas Drop Forge Co. | — |
| *Axelson Manufacturing Co. | — |

**B**

| | |
|---|---|
| *Baash-Ross Tool Co. | 5 |
| *Baker Oil Tools, Inc. | 3 |
| *Baldwin-Duckworth Division of Chain Belt Co. | — |
| The Baldwin Locomotive Works | — |
| *Bantam Bearings Corp. | — |
| *Baroid Sales Division | — |
| William M. Barret, Inc. | 79 |
| *The Barrett Company | 27 |
| *Bartlett-Hayward Division of Koppers Co. | — |
| *Bethlehem-International Supply Co. | — |
| *Bethlehem Steel Co. | — |
| *Black, Sivalls & Bryson | — |
| *Bradford Motor Works | 88 |
| *The Brewster Co. | — |
| *Broderick & Bascom Rope Co. | — |
| *Brown Oil Tools, Inc. | 82 |
| *The Buckeye Traction Ditcher Co. | — |
| *Butler Manufacturng Company | — |
| A. M. Byers Co. | — |
| *Byron Jackson Co. | — |

**C**

| | |
|---|---|
| Jo H. Cable | — |
| *Cameron Iron Works | 63 |
| *Cardwell Manufacturing Co. | 23 |
| Carnegie-Illinois Steel Corp. | — |
| *J. I. Case Co. | — |
| *Caterpillar Tractor Co. | — |
| *The Cavins Co. | — |
| *Chain Belt Co. | — |
| *Clark Bros. Co. | — |
| Clark Machine Co. | — |
| *Climax Molybdenum Co. | — |
| *Coffing Hoist Company | — |
| Columbian Steel Tank Co. | — |
| *Continental Motors Corp. | 4 |
| Continental Oil Co. | — |
| The Continental Supply Co. | — |
| *Fred E. Cooper Co. | 59 |
| *The Cooper-Bessemer Corp. | — |
| *Core Laboratories, Inc. | — |
| *Crane Co. | — |
| *Crum-Brainard | — |
| W. H. Curtin Co. | 87 |

**D**

| | |
|---|---|
| *Darling Valve & Manufacturing Co. | 83 |
| De La Vergne Engine Co. | — |
| Thos. Devlin Manufacturing Co. | — |
| *Diamond Chain & Manufacturing Co. | 29 |
| *Dixon Valve and Coupling Co. | — |
| *Dowell Incorporated | 6 |
| *The Dragon Manufacturing Co. | — |
| *E. I. du Pont de Nemours & Co. | — |

**E**

| | |
|---|---|
| *Eastman Oil Well Survey Co. | — |
| Economy Electric Lantern Co. | — |
| Elastic Stop Nut Corp. | — |
| Enardo Foundry & Manufacturing Co. | — |
| *Engineering Laboratories, Inc. | — |

**F**

| | |
|---|---|
| Failing Exploration & Drilling Co. | 86 |
| *George E. Failing Supply Co. | — |
| First National Bank in Houston | — |
| First National Bank & Trust Co. of Tulsa | — |
| Fluid Packed Pump Company | 35 |
| Ford Motor Co. | — |
| The Fort Worth Clearing House Assn. | — |
| The Fort Worth Laboratories | 79 |
| Fort Worth Steel & Machinery Co. | — |
| *Fester Cathead Co. | — |
| *Franks Manufacturing Co. | — |
| Frick-Reid Supply Corp. | — |

**G**

| | |
|---|---|
| Dr. Ionel I. Gardescu | 79 |
| *Gardner-Denver Co. | — |
| *The Garlock Packing Co. | — |
| *Gaso Pump & Burner Manufacturing Co. | — |
| Gay-Thornton Co. | — |
| *General Electric Co. | — |
| General Geophysical Co. | 39 |
| General Motors Sales Corp. | — |
| Geophysical Service, Inc. | — |
| *Globe Oil Tools Co. | — |
| *Goodyear Tire & Rubber Co. | — |
| *H. P. Gott Manufacturing Co. | — |
| *Gray Tool Co. | — |
| *Green Head Bit & Supply Co. | — |
| *The Guiberson Corp. | — |
| Gulf Envelope Co. | 86 |
| Gulf Oil Corporation | — |
| Gulf Publishing Co. | — |

**H**

| | |
|---|---|
| *Halliburton Oil Well Cementing Co. | First Cover |
| Hardway & Cathey | 79 |
| C. J. Harter, Machinery | — |
| *Haynes Stellite Co. | — |
| *Hazard Wire Rope, Division of American Chain & Cable Co. | — |
| The Hercules Powder Co. | — |
| *Hewitt Rubber Corp. | — |
| Hoard Exploration Co. | 79 |
| *Hobbs Manufacturing Co. | — |
| *A. C. Horn Co. | — |
| Houston Laboratories | 79 |
| Houston Pipe Appliances Co. | — |
| *Hughes Tool Co. | Fourth Cover |
| Humble Oil & Refining Co. | — |
| Hyatt Bearings Division | — |

**I**

| | |
|---|---|
| Independent Exploration Co. | — |
| Industrial Equipment Co. | 79 |
| *The Inferno Co. | — |
| *Ingersoll-Rand Co. | — |
| *International Harvester Co. | — |
| *The International Nickel Co. | — |

**J**

| | |
|---|---|
| Jarecki Manufacturing Co. | — |
| *Jensen Brothers Manufacturing Co. | — |
| *Johns-Manville | — |
| *M. O. Johnston Oil Field Service Corp. | — |
| The S. M. Jones Co. | — |
| *Jones & Laughlin Steel Corp. | — |

**K**

| | |
|---|---|
| The Kennedy Valve Manufacturing Co. | — |
| *Kerotest Manufacturing Co. | — |
| *Keuffel and Esser Co. | — |
| *Kinzbach Tool Co. | — |
| Kirkeby Hotels | 78 |
| *Koppers Co. | — |
| Kropp Forge Co. | — |

**L**

| | |
|---|---|
| Landis Machine Co. | — |
| *Lane-Wells Co. | 51 |
| *Larkin Packer Co. | — |
| The Thomas Laughlin Company | — |
| *The Layne & Bowler Co. | — |
| Lebanon Steel Foundry | — |
| *Le Roi Co. | — |
| *A. Leschen & Sons Rope Co. | — |
| *The Lincoln Electric Co. | — |
| *Line Scale Co. | 85 |
| *Link Belt Co. | — |
| Lone Star Cement Corp. | — |
| *Lucey Boiler & Manufacturing Co. | — |
| *Lucey Export Corporation | — |
| *The Ludlow Valve Manufacturing Co. | — |
| *Lufkin Foundry & Machine Co. | — |

**M**

| | |
|---|---|
| *MacClatchie Manufacturing Co. | 87 |
| Macwhyte Co. | — |
| P. R. Mallory & Co., Inc. | — |
| The Marley Co. | — |
| Marmon-Herrington Co. | — |
| John N. Martin Manufacturer | 87 |
| *Martin-Decker Corp. | — |
| McCollum Exploration Co. | — |
| *McEvoy Co. | — |
| McKissick Products Corp. | — |
| *Merco Centrifugal Co. | — |
| *Merco Nordstrom Valve Co. | Insert, 42-43 |
| *Merla Tool Corporation | — |
| *Metric Metal Works | — |
| *Midco Bailer Co. | — |
| *Miller Sand Pump Co. | 89 |
| *Minneapolis-Moline Power Implements Co | — |
| *Mission Manufacturing Co. | 8 |
| *Lee C. Moore & Co. | — |
| *Morse Chain Co. | — |
| Mott-Smith Corp. | 72 |
| Mudrite Chemicals, Inc. | — |
| Murray Rubber Co. | 84 |
| Muskogee Iron Works | — |

**N**

| | |
|---|---|
| National Bank of Tulsa | — |
| *National Lead Co. | — |
| The National Supply Co. | 24-25 |
| National Tube Co. | — |
| *Novo Engine Co. | — |

**O**

| | |
|---|---|
| *O.C.S. Manufacturing Co. | — |
| *Oil Center Tool Co. | — |
| *Oil City Brass Works | — |
| Oil Well Supply Co. | 31 |
| *Otis Pressure Control, Inc. | 85 |

**P**

| | |
|---|---|
| *The Parkersburg Rig & Reel Co. | — |
| *Patterson-Ballagh Corp. | 60 |
| *Pelican Well Tool & Supply Co. | 71 |
| Petroleum Electric Power Assn. | 67 |
| Petroleum Rectifying Co. of California | — |
| Petty Geophysical Engineering Co. | — |
| *Pittsburgh Equitable Meter Co. | Insert, 42-43 |
| *Pittsburgh Steel Co. | — |
| Plymouth Cordage Co. | — |
| *Portable Rig Co. | — |

**R**

| | |
|---|---|
| Reading-Pratt & Cady Division of American Chain & Cable Co. | — |
| *Rector Well Equipment Co. | — |
| *Reda Pump Co. | — |
| *Reed Roller Bit Co. | 85 |
| *Regan Forge & Engineering Co. | — |
| *Republic Steel Corp. | — |
| *The Rex Company | 84 |
| *The Ridge Tool Co. | — |

**S**

| | |
|---|---|
| Safety Gas Main Stopper Co. | — |
| Jack A. Schley | 79 |
| *Schlumberger Well Surveying Corp. | — |
| The Second National Bank of Houston | — |
| *Security Engineering Co. | 88 |
| Seismic Exploration Co. | — |
| Seismograph Service Corp. | — |
| Shell Oil Co., Inc. | — |
| Shilstone Testing Laboratory, Inc. | 79 |
| *SKF Industries, Inc. | — |
| A. O. Smith Corp. | — |
| *E. M. Smith Co. | — |
| *South Chester Tube Co. | — |
| Southern Engine & Pump Co. | — |
| Southern Pacific Lines | — |
| Spang Chalfant, Inc. | — |
| *Spang & Company | 40 |
| *Sperry-Sun Well Surveying Co. | — |
| Standard Supply and Hardware Co. | — |
| *Standco Brake Lining Co. | 86 |
| *Star Drilling Machine Co. | — |

**T**

| | |
|---|---|
| *Templeton, Kenly & Co. | — |
| Texaco Development Corp. | 33 |
| Texas Electric Steel Casting Co. | — |
| Texas Foundries, Inc. | — |
| *Texas Iron Works | — |
| The Thermoid Co. | — |
| Thompson Tool Co. | — |
| *The Timken Roller Bearing Co. | — |
| *Tretolite Co. | 37 |
| Trinity Portland Cement Co. | — |

**U**

| | |
|---|---|
| *Union Wire Rope Corp. | — |
| *Union Carbide & Carbon Corp. | — |
| *Unit Rig & Equipment Co. | — |
| *United States Rubber Co. | — |
| United States Steel Corp. | 31 |
| *Universal Atlas Cement Co. | — |

**V**

| | |
|---|---|
| *Vickers, Inc. | — |

**W**

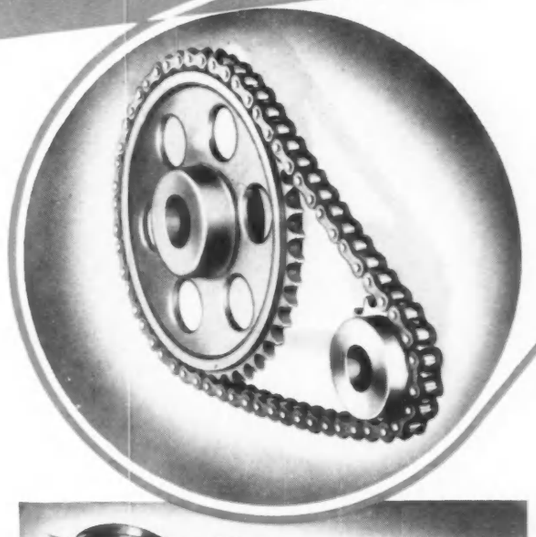
| | |
|---|---|
| Warner & Swasey Co. | — |
| *Waukesha Motor Co. | — |
| *Well Machinery & Supply Co. | — |
| Well Surveys, Inc. | — |
| *Westinghouse Electric & Mfg. Co. | — |
| *Wheeling Machine Products Co. | — |
| *The Wheland Co. | — |
| Wichita Engineering Co. | — |
| *Wickwire Spencer Steel Co. | — |
| *J. H. Williams & Co. | — |
| *Wilson Manufacturing Co. | — |
| *Wilson Supply Co. | — |
| Witte Engine Works | — |
| Wood Engineering & Construction Co. | — |
| *Worthington Pump & Machinery Corp. | — |
| Wyatt Metal & Boiler Works | — |

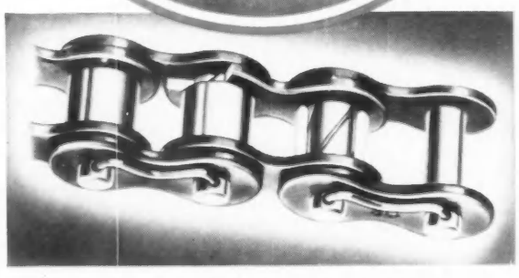
**Y**

| | |
|---|---|
| Youngstown Sheet & Tube Co. | 21 |

# MORSE ROLLER CHAIN

## GREATER DEPENDABILITY
## CHANNEL LUBRICATION
## INTERCHANGEABILITY





*Cutaway view shows rolled-in channel which takes oil from rollers, through sideplates, to the pins.*

Now, a roller chain that will take the hard service without complaining—and will need less service and maintenance.

It's the Morse Roller Chain—a round pin roller chain interchangeable with every other standard round pin roller chain. But there are important differences in Morse Roller Chain!

1. Exclusive design puts an oil feed system in every link, feeds oil to the pin and bearing surfaces, where wear causes most roller chain failures.
2. For greater strength and longer wear, rollers are turned from solid, hardened, special alloy bar stock.
3. Morse design permits heavier sideplates, providing the advantages of the heavy series in standard chain.
4. The Morse patented Spring Lock Pin (optional) will not shake out by vibration and will not chew.

Morse Roller Chain is available in standard and heavy series, in single and multiple widths.

Just off the press is an engineering and data book, giving complete construction and application information on the Morse Roller Chain. Ask Morse, Ithaca, or the Morse man near you for your copy of Bulletin R-54.

SILENT CHAINS ROLLER CHAINS FLEXIBLE COUPLINGS KELPO CLUTCHES

# MORSE *positive* DRIVES

MORSE CHAIN COMPANY ITHACA N. Y. DIVISION BORG-WARNER CORP.

ON-BOTTOM-STRATEGY

Your best Assurance
for a *Safe* HOLE
IS A
HUGHES TAILOR MADE
Rock Bit !

HUGHES TOOL COMPANY • HOUSTON TEXAS